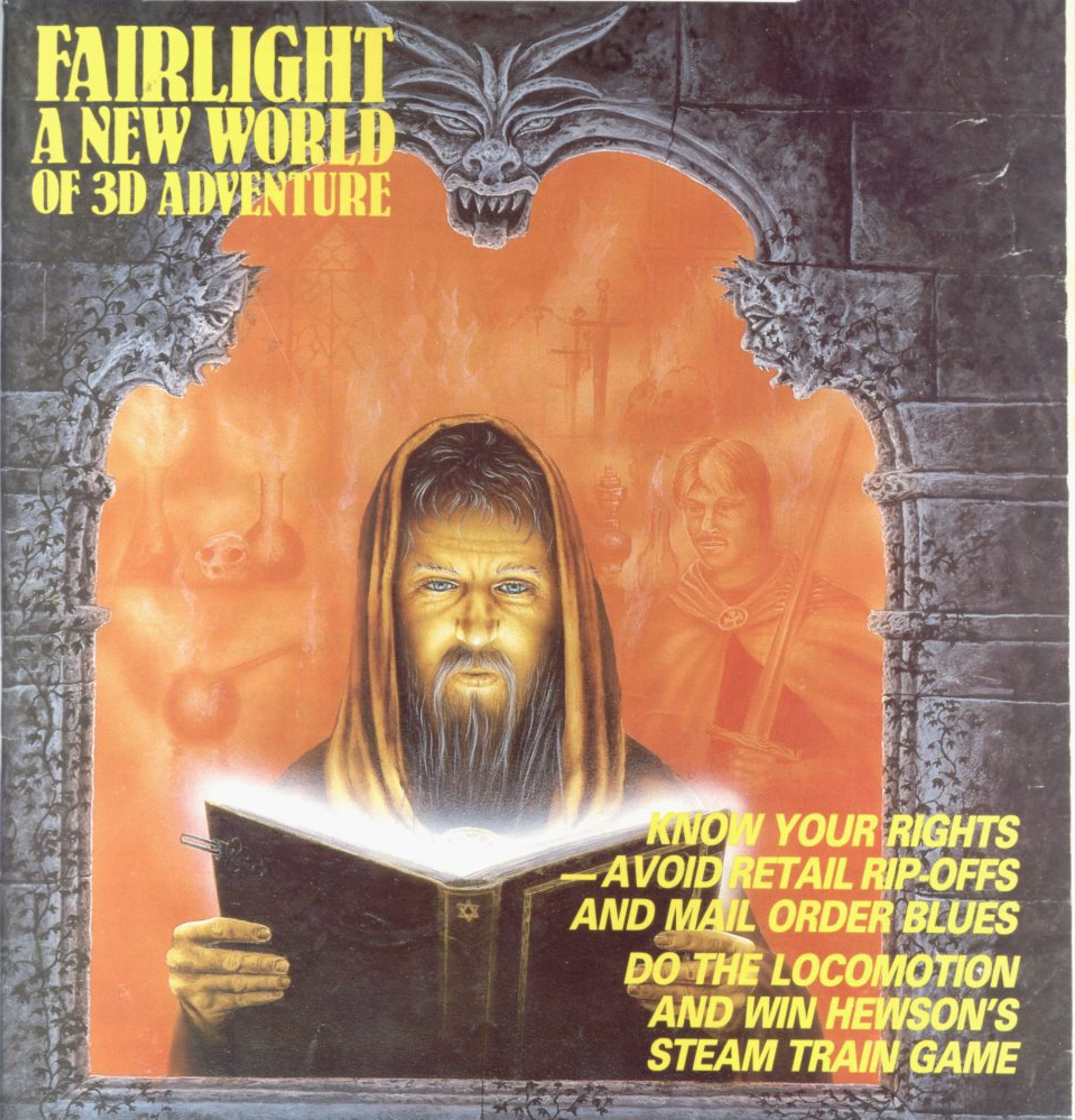
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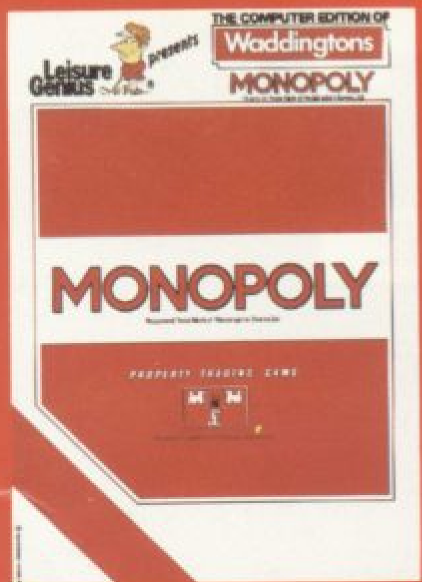


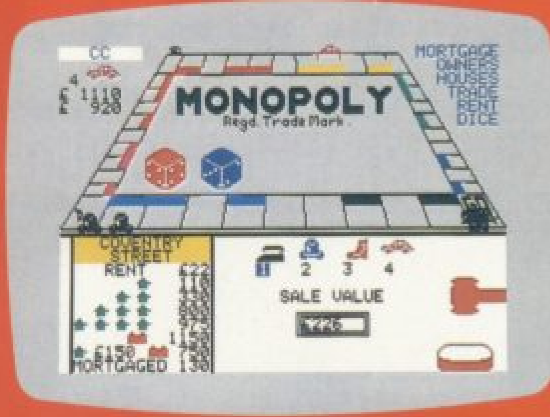
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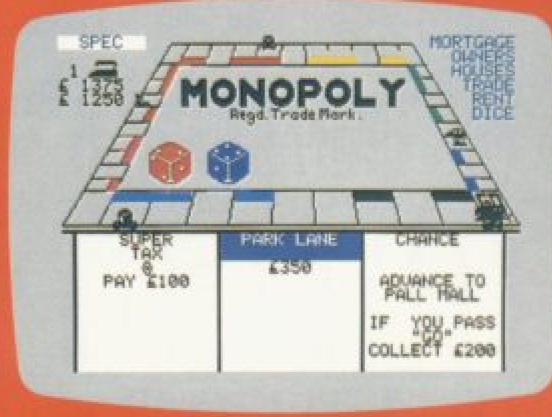
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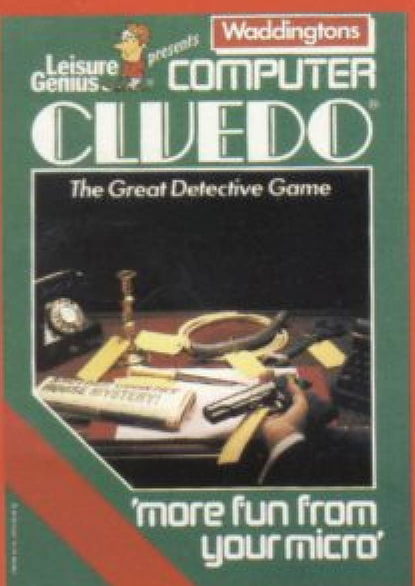






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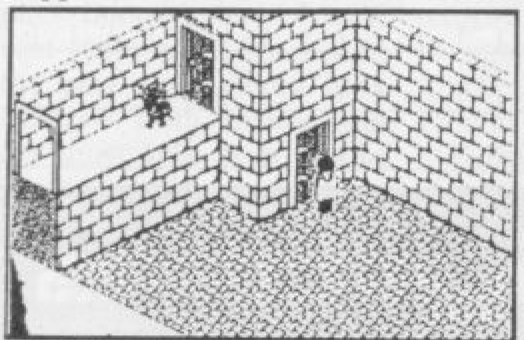
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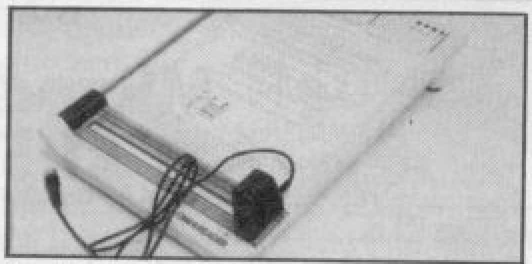
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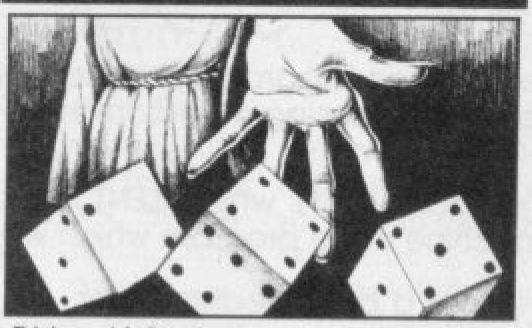
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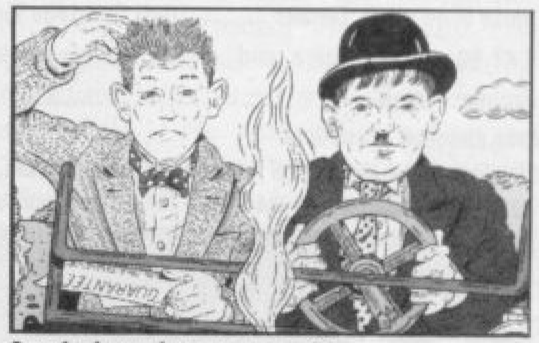


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If you would like to contribute to *Sinclair User* please send programs or articles to:
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Original programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included.
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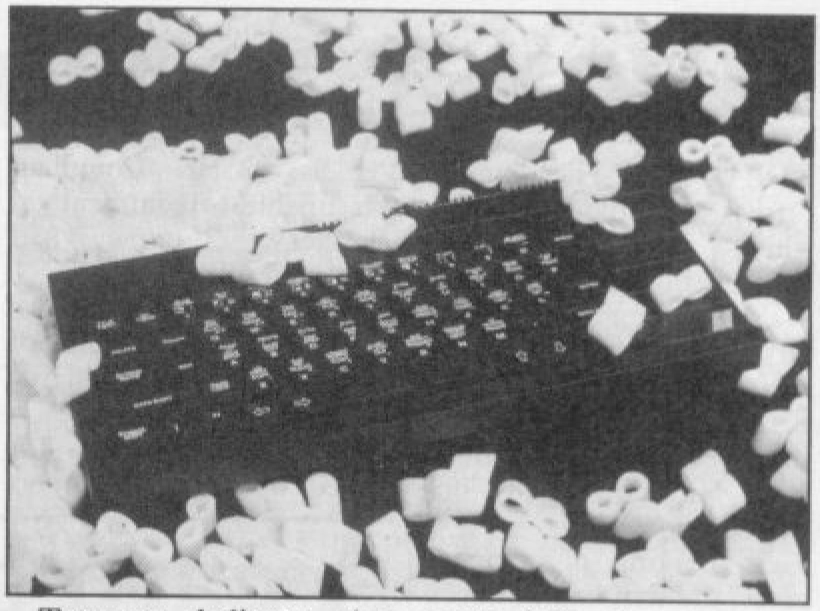
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Plus returns



RETURN LEVELS for the Spectrum Plus are still high, according to a Boots spokesman.

"It seems to take one person to sell a computer and three to deal with the complaints. The acceptable returns level is five to six per cent. Returns are running at four or five times that amount and 90 per cent of those faults are genuine."

The biggest problem occurs with the power supplies. Boots has had 14 different types from Sinclair in the past year. Many have suffered from overheating but most have been caught before distribution by rigid soak testing. "Timex does random spot checks but not enough. We hope that the quality control gets better as Sinclair switches from Timex to AB Electronics."

Simon Treasure of RAM/C, a company which distributes the Spectrum Plus to independent retailers, has been meeting executives at Sinclair Research to try and resolve the problem of quality control. "We are trying to set up an independent organisation which will monitor returns. We hope to be able to tighten quality control, which is certainly not as good as it should be."

Despite the heavy burden of returns which the industry is shouldering, news on sales of the Spectrum Plus is good, although gloom and a contraction of the market is being forecast.

Treasure believes that prices are going to come down and that the Spectrum Plus could be £99.00 before Christmas. "Machines will be priced at under £100.00 and there will be more of them. It will be hard for users to justify upgrading to a £400 machine such as the QL when there are so many cheap ones on the market. As a result computers will move into the consumer electronics field and be treated like washing machines or hi-fi systems."

He also believes that on current trends three quarters of a million computers will be sold this year, a drop of about 50 per cent on last year.

Sales will still be high but the market will contract considerably.

Sinclair warning

A WARNING to retailers has been given by Sinclair Research as machines targeted for markets abroad find their way back into Britain.

The Spectrum Plus machines were released by Timex to Zeta Services in a deal to pay off some of the debts owed to the company by Sinclair. The units have an overseas power supply and distributors, such as Terry Blood, will refuse to repair any returns from the stock.

A spokesman from Boots says he is confident that none of the products could get into the stores. "Our rigorous standards of testing and approval are well known. We test every batch we sell and any product which does not come up to scratch does not go to the shops."

The overseas Spectrum Plus carries a label which says: 'Export sale only — not guaranteed in the UK'. Potential Plus customers be warned.

Messing about in MUD

THE CULT adventure, **Multi-User Dungeon**, will soon be available to Spectrum owners via an enhanced version from British Telecom.

The original **MUD** was written by Richard Bartle and Roy Trubshaw for the Essex University DEC computer. They have formed a company, MUSE, in conjunction with Simon Dally, to market the game.

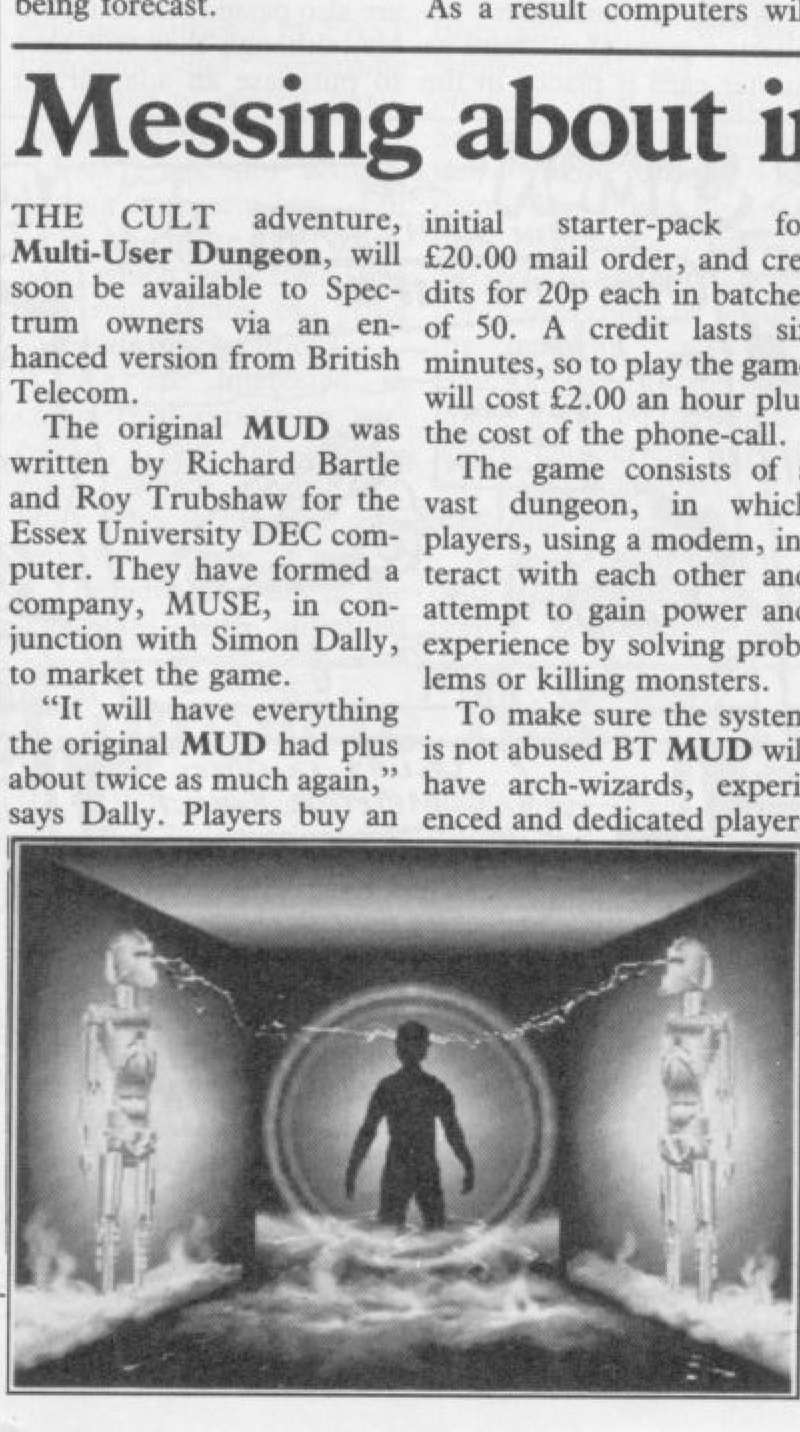
"It will have everything the original **MUD** had plus about twice as much again," says Dally. Players buy an initial starter-pack for £20.00 mail order, and credits for 20p each in batches of 50. A credit lasts six minutes, so to play the game will cost £2.00 an hour plus the cost of the phone-call.

The game consists of a vast dungeon, in which players, using a modem, interact with each other and attempt to gain power and experience by solving problems or killing monsters.

To make sure the system is not abused BT **MUD** will have arch-wizards, experienced and dedicated players who play free of charge and in return make sure players behave properly.

Spectrum owners will need a modem with software to make the screen scroll, which Modem House says it is able to provide, according to Dally. The popular VTX5000 modem does not do that by itself.

Those brave enough to get involved in what can be an expensive hobby will get the first month's play free if they join before November 5. It will be launched at the PCW show on September 4.



Dally is also involved with a book, *Introduction to MUD*, written by Duncan Howard and published by Century-Hutchinson at £4.95. It is aimed at people who want to know what **MUD** is, as well as providing practical advice for novice players and will be available in October.

more news on page 6

Hoover to sue Sinclair?



THE C5 may be heading for further trouble. Hoover, which manufactures the electric tricycle at its South Wales washing machine factory, has obtained a writ against Sir Clive Sinclair for a little more than £1.5m, supposedly for work done from November 1984 onwards.

At the time of going to press, the writ had not been served, and Hoover has not gone so far as to cease production of the C5, still running at the minimal 100 a week level. A spokeswoman for Sinclair Vehicles, Eileen Counihan, says "The writ would be vigorously contested if issued against Sir Clive personally". That presumably implies that it is Sir Clive's personal liability which is at stake, and that matters might be different if the writ was against Sinclair Vehicles itself. Counihan was unable to comment on whether the money had been paid or not.

Sinclair Vehicles is also awaiting the publication of the Advertising Standards Authority report on the C5 advertising campaign. A leaked draft of the report suggested that serious criticisms would be made of the campaign. "We would comply with any ASA rulings," says Counihan, "Although all ad claims were based on extensive research."

On another front, Bill Nichols, long-running PR man for Sinclair Research and later Sinclair Vehicles, has resigned the C5 account from the agency he now runs. The account returns to Kinnear, which handles Sinclair Research and Psion as well.

A card blow for pirates

CREDIT CARD software is on the way. It could help retailers and curb piracy.

The device used to program the cards is a PROM blower from Electric Software. The company sells the package to shops together with a stock of master cards on which are the latest software titles.

When a customer requests a piece of software its master card is placed in the black box PROM blower together with a blank PROM. The software is then copied to the blank card. The process takes less than a minute.

Using the system, retailers can dispose of the long racks of software and the difficult decision of which titles to stock. The benefits are also passed onto customers, although they will have to purchase an adaptor for their machines, priced at £7.00. The software is more robust and the device provides instantaneous LOAD. The main stumbling block is, however, that titles will cost £15.00. Electric Software is confident that it will soon be able to get the price down to £9.95.

The PROM cards should pose problems for pirates. They are almost impossible to copy.



New chief at Sinclair



Maxwell — thumbs up for Jeffery?

A NEW chief executive has been appointed to Sinclair Research. Bill Jeffrey has been appointed following a confused period during which a number of candidates were inspected.

Jeffrey's is an internal appointment. He joined the company in March of this year with responsibility for the flat-screen pocket TV, and appears to have had some success with it, obtaining a deal with chain-store Dixons and increasing the retail base generally.

Previously Jeffrey worked for Mars Electronics, with particular responsibility for marine systems. He speaks fluent German, which is seen as an asset in terms of Sinclair's plans for expansion in Europe.

The appointment may surprise some, who thought Sinclair Research required financial expertise as a priority at the top. Robert Maxwell, who is buying the company — a deal which should be finalised by October — is said to have been fully consulted over the appointment. Since Maxwell must surely have had a veto over any prospective chief executive, it looks as though Bill Jeffrey will be around for some time.

Sir Clive Sinclair praised Jeffrey's management and marketing skills, and says they "have already made an enormous contribution to the company." Since Nigel Searle, the former managing director, had already been put in charge of the American QL launch as early as January, it seems that Sinclair Research may have been grooming Jeffrey for the top job ever since his arrival in March.

Jeffrey has already announced his intention to increase Sinclair's involvement in overseas markets, which should mesh well with Maxwell's known plans to deal with surplus stock by obtaining contracts in Eastern Europe. Those plans have already been somewhat disappointed by the Soviet Union's decision to go for the Japanese MSX standard, but there remain markets in Poland and Bulgaria.

FAST piracy bill becomes law

SOFTWARE PIRATES face a bleak winter now that the amendment to the Copyright Act has been passed through Parliament.

What the new law does is simply to add the words 'computer software' after 'literary acts' and 'video works'. Lawyers have tended to believe that programs were covered anyway, but since there has been no test case to prove it, software houses have in the past been reluctant to prosecute.

The Federation Against Software Theft has therefore been lobbying for a clarification of the law, and now that has been achieved FAST has appointed an enforcement co-ordinator. The man in the hot seat is Bob Hay, a former chief superintendent of police. His previous experience includes the notorious Grunwick dispute in North London and the Iranian Embassy siege. On the piracy front he was active in breaking a large operation pirating Indian films.

A spokesman for FAST says Hay will be involved primarily in sorting out the evidence gathered by FAST members and organising some sort of central monitoring system.

FAST will not actually initiate prosecutions, but seeks to ensure that members, which range from IBM to Virgin Games, can bring successful prosecutions.

"We are interested in commercial pirates in particular," says the spokesman, "which means anybody who is pirating software for commercial gain."

The new penalties in the legislation, with unlimited fines and up to two years imprisonment for serious offences, come into force on September 16, so prosecutions will be delayed until then. "But I have no doubt that Trading Standards officers are aware of a number of operations in being at the moment," says Bob Hay. "I talked to one police force, north of the border, where counterfeit software was being sold blatantly in street markets.

"I hope it will be a long cold winter indeed for the pirates. Very cold."

Complete business package

IF YOUR business is in chaos, SMT, in conjunction with Rotronics, may have just the package to sort out the mess.

The package comprises a Spectrum Plus, Rotronics wafadrive, Rotronics DX85 printer, four wafers, a Centronics lead and three pieces of software — **Finance Manager, Address Manager** and **Stock Manager** from Oxford Computer Publishing. The package would cost £540 if items were bought individually, but is currently available at £485 inclusive.

Contact SMT, Bengal Lane, Greens Norton, Towcester, Northamptonshire NN12 8BE.

The DX85 is a high speed dot-matrix printer combining a number of features.

The printer costs £199.95 from Rotronics Ltd, Santosh House, Marlborough Trading Estate, West Wycombe Road, High Wycombe, Buckinghamshire HP11 2LB.



more news on page 8

The winning Protocol

THE *Sinclair User* offices were snowed under with entries to the **Fourth Protocol** competition, which appeared in the July issue.

The first 10 winners, who each win a package of the novel and the game, are:

M P Fahey, RAF Akrotiri, Cyprus; Thomas Cohen, London N2; V Macdonald, Leeds 11; N M Robinson, Romford, Essex; M J Ablott, Scunthorpe, South Humberside; Steve Palmer, Selsdon, Surrey; C Hanvey, Co Antrim, Northern Ireland; Peter Tong, Paris, France; Neil Murray, Musselburgh, Scotland; K Richards, Lyme Regis, Dorset.

The 40 runners-up, who win copies of the game only, are: Alex MacKenzie, Ellon, Grampian; L Lucas, Birmingham B37; Jorgen Jacobsen, Glostrup, Denmark; G Thomas, Gleaston, Cumbria; David Hayter, Stanford-Le-Hope, Essex; Nicholas Percival, Sawston, Cambridge; G Church, Witney, Oxfordshire; Dave Friend, Etchingham, East Sussex; Daniel Chester, Dartford, Kent; M G Baker, Borehamwood, Hertfordshire; Andrew Norton, High Wycombe, Buckinghamshire; T A Garcia, Shrewsbury, Shropshire; L Huiswood, Amsterdam, the Netherlands; Andrew Milne, London N18; M J Cannar, Bradford, West Yorkshire; Andrew Palmer, Llanfairfechan, Gwynedd; Anthony Gregson, Poynton, Cheshire; Jenny Tyack, Wallingford, Oxfordshire; Angus Phillips, Wimbourne, Dorset; James Williams, Nantwich, Cheshire; Stephen Owen, Norwich, Norfolk; J S Rix, Hitchin, Hertfordshire; Mats Lindgren, Sjalvad, Sweden; Harry Moscrop, Harrow, Middlesex; Justin Llewllyn-Jones, Newport, Gwent; P Birschel, Whitehaven, Cumbria; T M King, Godolphin House, Windsor, Berkshire; A J Newell, Deeside, Clwyd; R Brass, Bishop Auckland, Co Durham; D Oulton, Edinburgh; R Maidment, Sutton, Surrey; Adam Lee, Llandaf, Cardiff; G J Ball, Wolverhampton, West Midlands; K Orr, Bradford, West Midlands; Christopher Haines, Barnwood, Gloucester; Jan-Juan Tangen, Vestnes, Norway; Scott Macfarlane, Edinburgh; Andy Riddick, Gravesend, Kent; Daniel Hall, London N3; M Fletcher, Gloucester.

The message, when decoded, reads: THE OPPOSITION HAS BROUGHT FORWARD THE EVENT. THE PLAN IS TO DETONATE THE BOMB AT MIDNIGHT TONIGHT. BY THE TIME YOU GET THIS MESSAGE THE BOMB WILL ALREADY BE IN PLACE AT THE BASE. DO NOT ATTEMPT TO REMOVE IT UNTIL IT HAS BEEN DISARMED. THE COMBINATION IS FOUR SEVEN ZERO THREE. GOOD LUCK. The code was of the simple substitution type, with the key word CENTURY, followed by the remaining letters of the alphabet, replacing the usual alphabetical sequence.

Pimania is solved

THE GOLDEN SUNDIAL of Pi, subject of **Pimania**, the longest unsolved adventure quest, has finally been found.

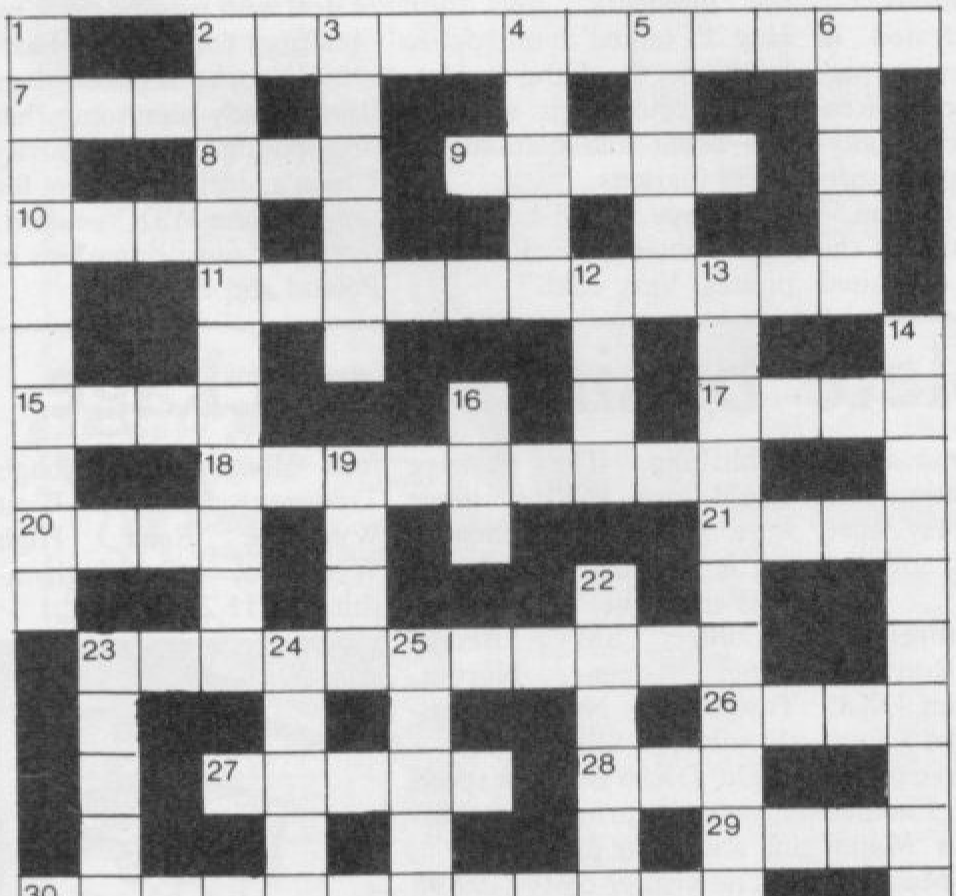
On July 22, Sue Cooper and Lizi Newman of Ilkley, Yorkshire, unearthed the sundial which was buried in the mouth of the chalk horse at Hindover Hill in Sussex. "Sue and Lizi bought **Pimania** in 1982,' says Automata's Christian Penfold. "They've travelled thousands of miles and toured like mad."

The all important clue was the letters CAGG — CA, the chemical symbol of calcium and therefore chalk and GG, a gee gee or horse. Many players worked out the day on which the quest would be solved — the twenty-second day of the seventh month — but not where to look for it.



A printed book of the solution is available from Automata, PO Box 78, Southsea, Hampshire for £1.00.

ZXWORD *by Henry Howarth*



Across

2. Doing more than one thing at a time, like the QL (12)
7. Office computer that followed the Mona? (4)
8. Note Thatcher's operating system (2/1)
9. CIA is confused by coding system (5)
10. Shove onto the stack (4)
11. Mostly in term, active use made of this sort of software (11)
15. Wally, perhaps, introduced to semiconductors (4)
17. Output from a wordprocessor (4)
18. Silicon Fen (9)
20. Stand-alone musical performance (4)
21. To put it squarely, four's is two and nine's is three (4)
23. One hoping to mate with Novag, Constellation or the White Knight? (5,6)
26. Sort of connector on board the mother? (4)
27. George who invented an algebraic system of logic (5)
28. Got one's teeth into binary, perhaps (3)
29. Amend the listing in bed, it would appear (4)
30. REM is less bad clue for decoder (12)

Down

1. Flexible record of micro storage (6,4)
2. The object of an assembler (7,4)
3. List I'm compiling of the highest and the lowest (6)
4. Strange tales of magnetic flux density (5)
5. Move a bit to the left or the right (5)
6. Negative sort of semiconductor (1-4)
12. Wot! — no hole in punched card? (4)
13. It may perform some fairly basic translation (11)
14. Elements of a language may be sent from the bank (10)
16. A bandit would have one in the amusement arcade (3)
19. Memory diagrams (4)
22. Least significant Bit O my clue for a sign (6)
23. Tenth grade temperature scale? (5)
24. Prevents full CHR$(56)'s (5)
25. Electrical signal felt after an accident (5)

Solution on page 110

New releases

TAKE PART in Activision's **Ballblazer,** the ball game of the universe, played simultaneously with a friend or against droids. **Ballblazer** will be up and running in September at £7.99.

Also from Activision is the **Great European Cross Country Roadrace** in which you take the wheel of a rally car and do Europe the hair-raising way. Keep an eye on your car's performance as it won't run on air and bald tyres won't get you far.

Defeat the evil being which has turned the villagers of **Nightshade** into the walking dead. Ghastly skeletons, demons and plagues await anyone brave enough to cross the village's boundary. Ultimate's latest is out now for £9.95.

Following the theft of your report in **Skooldaze,** Microsphere is giving you the chance to replace it. Life is not easy for a grubby skoolboy and distractions include a girls' school on the other side of the playing field. Ahem! **Back to Skool** will be out in early November at £6.95.

Robin Hood, that legendary figure of Sherwood Forest is now performing great deeds on your Spectrum. In this adventure, from Adventure International, help Robin restore the Touchstones of Rhiannon to their rightful owner. **Robin of Sherwood** is out now for £9.95.

Following hot on the heels of **Komplex** is **Komplex City,** from Legend. Collect the target letters of **Komplex City** while scoring maximum points. It's on the streets now at £9.95.

A further effort to help the starving in Ethiopia is being masterminded by Gremlin Graphics, which is bringing out **Tinderbox** with all profits donated to the Ethiopia Appeal. **Tinderbox** is an adventure featuring a soldier who has been put under an evil curse. To break the spell he must find and marry a beautiful princess, although the road to her castle is not easy. It is priced at £4.99.

In September Kempston releases **Chicane,** a racing simulation based on the Formula Ford 2000. You will have to qualify first and then take part in the race itself. **Chicane** will cost around £6.50.

Chartwatch

IT'S ALL CHANGE this month, as the new summer games overtake the charts with a vengeance. Fastest risers include **Hypersports, Cauldron, Jet Set Willy 2, Rocco, Spy vs Spy** and **A View to a Kill**.

The other new entries are **Nodes of Yesod**, the dreadful **Action Biker, Empire Fights Back, Glass, Knockout,** and **Battle for Midway** — nice to see a strategy game selling well. That old favourite, **Jet Set Willy**, has re-entered — presumably on the back of the new version.

After a brief flirtation with success, **Minder** has disappeared, as has **Chuckie Egg 2** and **Grand National**. Best sellers **Raid Over Moscow, Everyone's a Wally, Death Star Interceptor, Booty** and **Dragontorc** have also, at last, been deposed, though **Daley Thompson's Decathlon** and **Alien 8** are still hanging on in.

Noticeable by their absence are *Sinclair User* Classics **The Fourth Protocol** and **Frankie Goes to Hollywood**, both of which had delayed release dates.

And where is Elite's **Frank Bruno's Boxing**? Has it already been floored by its inferior rivals **Rocco** and **Knockout**?

GALLUP TOP 30

This chart is compiled by Gallup by sampling sales at 250 retail outlets, including high street chain stores and independent home computer shops

MONTH ENDING JULY 19

1	SOFT AID	QUICKSILVA/VARIOUS
2	HYPERSPORTS	IMAGINE
3	CAULDRON	PALACE
4	SPYHUNTER	US GOLD
5	JET SET WILLY 2	SOFTWARE PROJECTS
6	ROCCO	GREMLIN GRAPHICS
7	DUN DARACH	GARGOYLE GAMES
8	SPY VS SPY	BEYOND
9	VIEW TO A KILL	DOMARK
10	SHADOWFIRE	BEYOND
11	WORLD SERIES BASEBALL	IMAGINE
12	STARION	MELBOURNE HOUSE
13	ROCKY HORROR SHOW	CRL
14	BRUCE LEE	US GOLD
15	NODES OF YESOD	ODIN
16	TAPPER	US GOLD
17	ACTION BIKER	MASTERTRONIC
18	ALIEN 8	ULTIMATE
19	EMPIRE FIGHTS BACK	MASTERTRONIC
20	FINDERS KEEPERS	MASTERTRONIC
21	DALEY THOMPSON'S DECATHLON	OCEAN
22	HERBERT'S DUMMY RUN	MIKRO-GEN
23	MATCH DAY	OCEAN
24	GLASS	QUICKSILVA
25	GYRON	FIREBIRD
26	KNOCKOUT	ALLIGATA
27	BATTLE FOR MIDWAY	PSS
28	JET SET WILLY	SOFTWARE PROJECTS
29	GREMLINS	ADVENTURE INTERNATIONAL
30	FORMULA ONE SIMULATOR	MASTERTRONIC

Support dies for QL

THERE IS no future in the QL market.

That is the view of a number of companies, including Adder, CP Software and Computamate, which have decided not to release any new QL products.

Each company has made the decision independently, but the reasons behind the moves are almost the same.

CP Software has had its fingers burned with the launch of its only QL title. **Bridge** has been selling well by mail order and many retailers have taken it. Chris Whittington of CP is finding it costly to support even the one product: "The QL is a bit of a catastrophe. We have had a good response from distributors. The problems occur with the returns. We get more microdrives back than cassettes because of unreliability. It costs us more to replace a microdrive cartridge than a cassette."

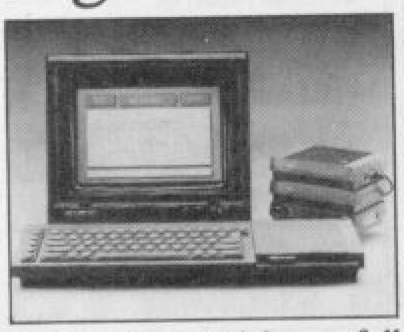
Adder Publishing is suffering the same trouble. Spokesman Adrian Dickens says: "The market is very depressed and there is not much future in it. Sinclair is showing no encouragement or help with duplication and it is largely left up to the individual companies to make arrangements.

"We will continue to support our current range but are moving into the IBM compatible market."

Computamate, manufacturer of a QL disc interface, has also decided to pull out of what it sees as a tricky market.

Comms given go-ahead

QL COMMS, the communications package from Tandata, has received British Telecom approval. The modem can now be linked direct to any BT appliance.



According to Tandata, orders for QL Comms have been coming in at 'a very healthy rate'. A spokeswoman for the company says: "It is still early days but we are seeking distributors so we can get the product out to retailers."

The package comprises: an intelligent serial port, full RS232 output and modem. More information can be obtained from Tandata Marketing, Albert Road North, Malvern, Worcestershire WR14 2TL.

No launch in the US?

THE SPECTACULAR launch of the QL in the US has not materialised.

Nigel Searle, former managing director of Sinclair Research, went over to the States in May to organise the bonanza for which, he said, the American people were ready. Although Searle encountered 'immense interest' from the market little of that turned into hard cash.

A spokeswoman for the company comments: "Nigel Searle did not want to jump into a new and different market straight away."

So, any Americans wanting a QL will have to buy it from Sinclair Research at $499.00.

Snowsoft's maze game

CHAMBER CAPERS is the first arcade adventure from Snowsoft, a new company dealing exclusively in QL software.

Richard Snowdon, author of the program says: "the ultimate goal is to find a key. On the way through the maze you can pick up various objects which will aid you in your battle."

Snowsoft sees education as a more lucrative market than games, so **Chamber Capers** may be your first and last chance to see a game from Snowsoft.

U-turn on disc policy

IN A DRAMATIC turnaround of policy, Sinclair Research has adopted a disc drive and interface package.

When the QL was launched, Sinclair stressed that it would leave floppy disc technology to others. Now the company has admitted that discs are important and chosen the package from Micro Peripherals.

Surprisingly, quality and performance are not the main factors used to decide which peripherals Sinclair adopts. A spokeswoman Says: "We do not claim that the peripherals which we badge are the fastest or even the best. They are the ones which are most compatible with our other peripherals."

The Micro Peripherals package does seem to be a strange choice. All other QL interfaces use the device name FLP. Sinclair has chosen to use the only package which uses FDV — for reasons of compatibility with MDV for microdrive.

A single drive coupled with interface and utility software costs £258.00, with additional drives available for £139.00 each.

Shop lacks software

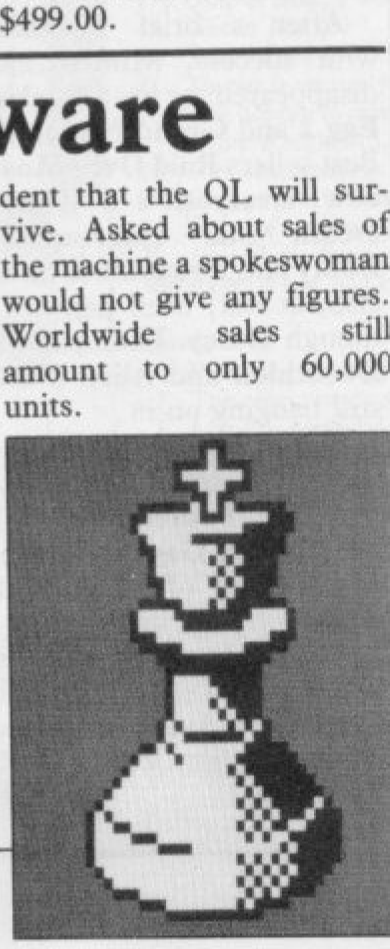
RETAILERS have been complaining about the lack of good QL software — in particular, games.

WH Smith is the leader in terms of size of range. It has three Sinclair Research products, including **QL Chess.** It also carries the two adventure games from Talent, a home accounts package from Dialog and **Sprite Generator** from Digital Precision.

Dixons, Currys and Laskys are not so lucky. You will be hard pushed to find a copy of **QL Chess** or Talent's West in those stores.

Boots is lagging way behind the rest of the retail chains. A spokeswoman announced that the company has just started to stock the QL but had to admit that "we only stock the package that we got with the QL order and a package from Talent". If you had not guessed, the package from Sinclair Research is **QL Chess** and Talent has supplied **GraphiQL**.

Despite the gloomy news, and even gloomier forecasts, Sinclair Research is confident that the QL will survive. Asked about sales of the machine a spokeswoman would not give any figures. Worldwide sales still amount to only 60,000 units.



Load of hassle

WHY IS IT that software houses charge £15.00 for products and then present them on sub-standard cassettes?

Take **The Hobbit**. I've heard it's very good and I'm already on my second copy. I've one tip for adventurers; type LOAD etc and then press play — a message will appear on the screen, no prizes for guessing what it is. I'd like to progress further than 'Tape loading error' but it is not to be.

It is possible to present programs on reliable tape — I've bought numerous cheapies and never experienced difficulty. The above fact also points away from unreliable equipment.

I must say here that I've had no trouble exchanging tapes but why should I have to put up with the hassle? If other people experience difficulty they should boycott the companies involved. You'll never catch me purchasing another Melbourne House product.

Until the bigger companies pull their fingers our perhaps we should support only the 'small boys' in the industry — after all, they can't afford to alienate the consumer.

Andy Whitlam, Retford, Nottinghamshire

● *I bet the lads and lasses at Melbourne House are having sleepless nights already.*

Despite what you say, your problems are much more likely to stem from a particularly cantankerous tape recorder than inferior cassettes. The odd half-dozen users have been able to load and play **The Hobbit**, *so we've heard. John Gilbert did, anyway.*

You'll never believe this

I BOUGHT a 48K Spectrum a few months ago and at the same time ordered another Spectrum magazine regularly.

I tried programming from this mag to no avail, and on asking a fellow owner I found out that the mag does not cater for us amateur users when it comes to programming UDGs.

I bought a couple of issues of *Sinclair User* and found some graphics instructions for the listings. I typed in **Bomber Boris** — May, 1985 — and it loaded first time!

P Hall, Scole, Norfolk

● *Hold the front page! Someone has actually got one of our listings to work. Chris Bourne must be slipping.*

Jumbo-lovers fly off handle

MAY I SUGGEST you submit some of your reviewers to bench-test and service. The May review of **747 Flight Simulator** was an insult to those readers who, like me, bought a copy of 747, read the manual with attention and proceeded to an enjoyable piece of computer-assisted learning.

C R Oswin, Christchurch, Dorset

● *For accuracy and entertainment most consumers would get better value from Psion's* **Flight Simulator** *or Digital Integration's* **Fighter Pilot.** *Those who want to get into a pedestrian jumbo will enjoy 747, but I fear they're in the minority. Chris Bourne.*

Extra feature with Easyedit

WITH reference to my utility program **Easyedit** in the June Issue. One useful feature omitted from the article is that the routine can be switched off by typing #X. Provided that RAMTOP has not been changed and that data has not been POKEd or LOADed into the space occupied by the program then **Easyedit** can be restarted by typing RANDOMIZE USR 60702.

David Wright, Egremont, Cumbria

Where to put your POKEs

AS A recent buyer of a Spectrum Plus I have noticed that POKEs are mentioned in letters about games.

Could you please explain what these POKEs are?

I R Carpenter, Birmingham

● *Most of the POKEs given in our Zap Chat column must be added to the Basic loader programs which are used to load in the machine code. To gain access to a loader type MERGE "" instead of LOAD"". The program will stop, at which point you should stop the tape recorder and list the program.*

POKEs should be put at the beginning of the Basic listing, before the RAND USR commands which invoke the game. When the amendment has been made, run the loader again and restart the tape.

Another crop of rhubarb . . .

HAVING just purchased the August issue of *Sinclair User*, I am disappointed and concerned to see yet more letters concerning C5s and politics appearing in your pages. I refer to those from Dietmar Osman and Michael J King.

As a serious and enthusiastic Spectrum user, I do not consider the pages of a quality publication of *SU*'s standard to be a fitting place for the discussion of political issues and other non-computer related subjects.

Congratulations must go to all *SU* software reviewers for their accurate and unbiased reports, despite being under fire from people such as Mr King. While I understand that some software is certain to upset some people, those people have no right to force their opinions upon the rest of us. So please, please, please, let us see an end to this senseless bickering.

R A Smith, Boston, Lincolnshire

● *Now, now, boys. It'll end in tears . . .*

Bone of fishy contention . . .

I'VE GOT some bones to pick with you.

While reading a review of **Nodes of Yesod** in the August issue, by whatsername, Clare Edgeley, I read that 'fish swim quite happily in zero gravity.'

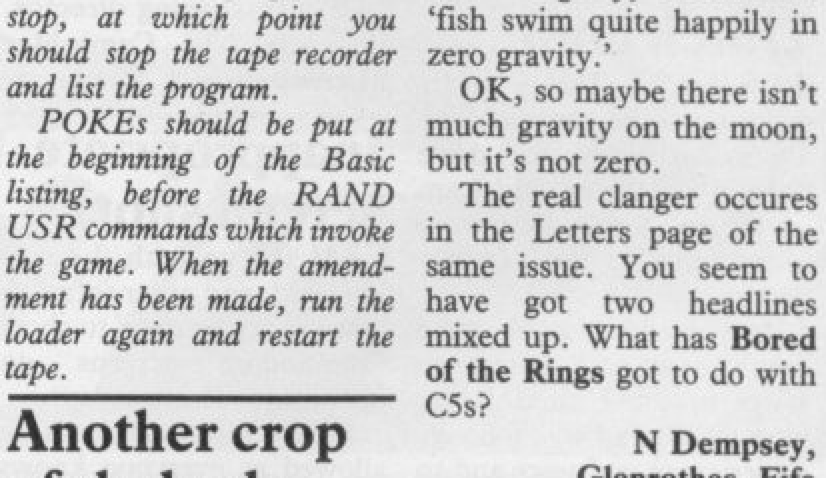
OK, so maybe there isn't much gravity on the moon, but it's not zero.

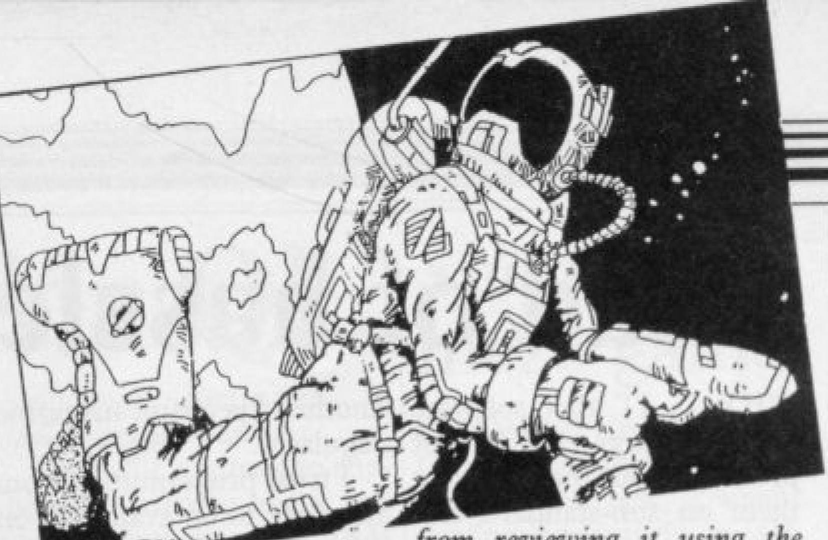
The real clanger occures in the Letters page of the same issue. You seem to have got two headlines mixed up. What has **Bored of the Rings** got to do with C5s?

N Dempsey, Glenrothes, Fife

● *There probably aren't too many fish on the moon either.*

As for the headlines mix-up, we do these things deliberately just to check that you're still awake after reading the QL news page.





Incorruptible

I AM WRITING to congratulate you on your policy with regard to reviewing your advertisers' software.

I used to hold the cynical view that the wrath of advertisers would not be risked by publishing an adverse report on their products. This was proved to be wrong by the thumbs down you gave to the disgraceful **Car Cure** program in the July edition, which also carried their advertisement.

Integrity is hard to find these days, so keep up the good work.

J H Godfrey, Handsworth, Birmingham

Double-density Dutch club . . .

FOR SOME TIME past I have been the owner of an Opus Discovery disc drive for my Spectrum, and I am trying to start a Discovery users club in the Netherlands.

We would like to come into contact with Discovery users in the United Kingdom or abroad to exchange experiences, software and so on.

D C Kruithof, Boeierkade 6,' 2725 CH Zoetermeer, The Netherlands

Polyprint the tower of Babel

WE WERE pleased to see the good coverage of Polyprint, the multilingual Centronics interface for the Spectrum, in your July '85 issue. You may find these additional comments appropriate.

The 'preliminary' user notes supplied did not sufficiently emphasise that multiple languages can in fact be used in the same text, both on the printer as well as on the screen. That feature, together with the adaptation to **Tasword**, we feel gives it a very powerful potential in the European context.

Thanks to the downloadable fount capability of the Epson FX80 and the availability of EPROM programmers, it also becomes possible to implement languages such as Turkish or Icelandic which do not on their own provide sufficiently large markets for manufacturers to bother with.

Finally, the EPROM in Polyprint is a handy place for storage of general utility programs quite unrelated to the printer. Over 7K of space is available for utilities.

K Pandey, managing director, Cambridge Microelectronics, Cambridge

Inappropriate screen shots

I AM fed up with the way US Gold, and other software houses, are starting to show Commodore screens on Spectrum cassette inlays.

Surely this should not be allowed as everyone knows that Commodore graphics are better.

Douglas Downie, Airdrie, Lancashire

John Gilbert's teleport trials

WE WERE bemused by John Gilbert's 'review' of our game **EVA** for the QL in the July issue. This was so full of inaccuracies we wonder if he loaded the program.

Any game which uses the cursor keys is compatible with a joystick. Since Mr Gilbert owns a joystick why didn't he use one?

We don't believe Mr Gilbert finished the first screen as the object assembled is obviously a Giant Robot not a teleport booth.

Mr Gilbert's reaction differs from that of *Popular Computer Weekly* who said, "it really is great fun . . . very enjoyable and entertaining . . . Easily the best game for the QL to date". Perhaps they actually played the game.

Andrew F Greenwood, Westway,' Lytham, Lancashire

● *Oh, sorry. We didn't realise that if a game was joystick compatible we were forbidden from reviewing it using the keyboard. As it happens, our QL joystick didn't appear to work with* **EVA**.

John Gilbert failed to recognise the unit as being a giant robot. Perhaps he was confused by your playing instructions, which refer throughout to a 'teleport module'.

Easily the best game for the QL to date? Considering the current dearth of even halfway decent QL arcade games, that would hardly be difficult.

Starion fans fight back

I AM WRITING to set the record straight on **Starion** after J W Ewart's misleading letter — July issue. The game is good value and not impossible to complete. It certainly wouldn't appeal to the blast-anything-that-moves brigade but anyone with a penchant for word games as well as an itchy trigger finger will find it a challenge.

The password to the first time block is Aerospace — you'll need to work out 90 anagrams to get that far.

Jim Grimwood, London E16

Lonely ROMs

I WOULD like a foreign penfriend to swap tips, games, ideas and hints for my 48K Spectrum.

Richard Sharp, 83 Almsford Road, Acomb, York YO2 5ML

HI! I'm an Italian boy owning a 48K Spectrum, soon with a VTX 5000 modem. I would be glad if any British kid, with a Spectrum, would like to write to me to exchange programs, ideas and anecdotes about our everyday life. I am 18.

Fabio Fachin-Sacchelli, Via Piaggio 6/8 Sc B 16136, Genova, Italy

I AM a 13-year old boy from Israel. I own a 48K Spectrum and would like to have a penpal from the UK.

Kobi Gal, PO Box 7209, 52171 Ramat Gan, Israel

I WOULD like to have some penpals to swap games, hints and tips for the Spectrum 48K.

Helgi Sigurdsson, Heidmork 1A, 800 Selfoss, Iceland

I WOULD like some 48K Spectrum penfriends. I am 16.

Finnur Hardarson, Reynivollum 10, 700 Egilsstodum, Iceland

I AM Portugese and would like to exchange software with Spectrum users.

Paulo Farinha, Av D Nuno Alvares Pereira, L-3 5ESQ, 2800 Almada, Portugal



Hypersports

I HAVE just achieved, on Imagine's **Hypersports,** a total score of 149068, taking 20 minutes. Here are the individual events:

Swimming — 27 secs; long horse — 8.69 marks; skeet shoot — 9100 points; archery — 3320 points (wind 7); triple jump — 13m 40; weightlifting — middleweight (210).

Other high scores include: **Tapper** — 83775 on Easy; **Spyhunter** — 230500 on Expert; **Death Star Interceptor** — 9600 on Lieutenant.

Stephen France, London SE26.

Monty is Innocent

TO PUT the record straight, Tony Winterbottom — Zap Chat, August — is not world champion at **Monty is Innocent.** I completed it in 58 seconds. Luck is more important than skill for a fast time.

Matthew Phillips, Bristol

Travel with Trashman

I WROTE to Rod Evans, of New Generation, claiming to be the first person to complete **Travel with Trashman** and he told me that I am the first person who has sent positive proof of completion.

At the New Gen office the hi-score is 23400 which I beat with a magnificent 25914. My route around the world is: London-Madrid-Paris-Munich-Moscow-Jerusalem-Benares-Hong Kong-Alice Springs-Samoa-Chichen Itza-New Orleans-Sao Paulo-Kanyu.

At the end the message appears: "Time machine found in Kanyu. That is because the new game from New Gen may be Trashman in Time".

JC Lockwood, Lowestoft, Suffolk

Dummy Run

I HAVE finished **Herbert's Dummy Run** with 89 jelly babies at 1:30 on June 12.

Sean Kelly, Woodthorpe, Nottingham

Rocky Horror Show

I SUCCESSFULLY completed **The Rocky Horror Show** on June 19.

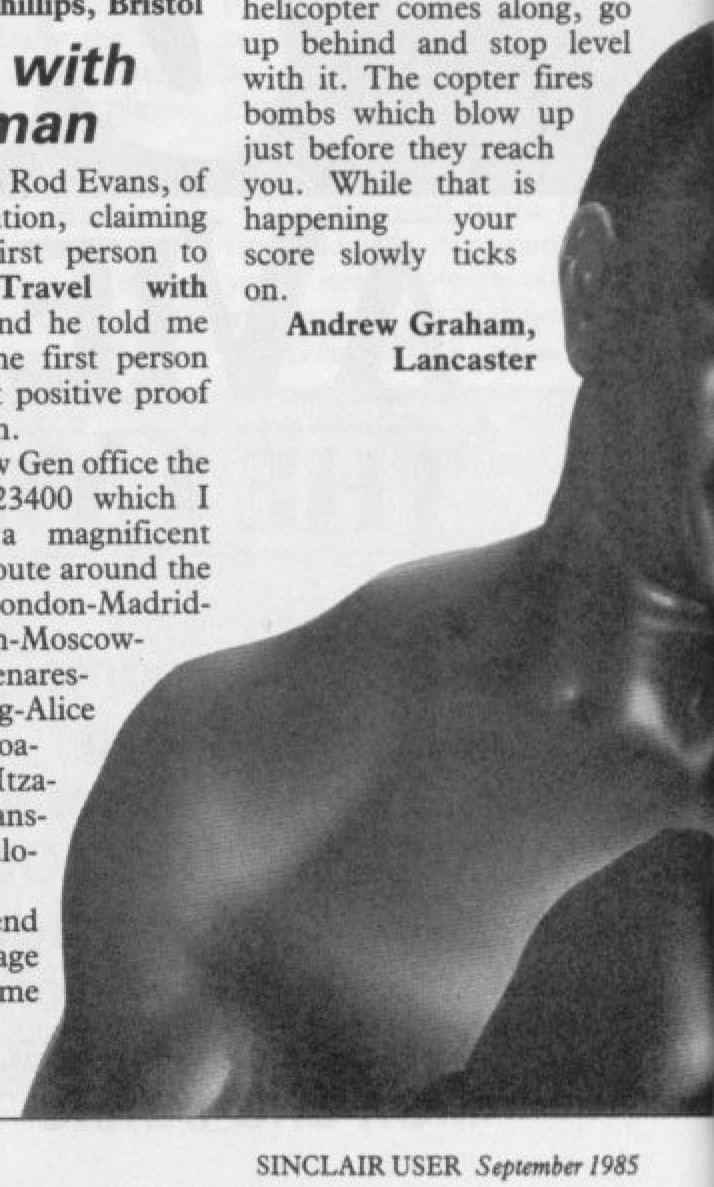
After collecting all the pieces and placing them behind the curtain, you must turn the freezer off and return to the curtain again. Touching the machine displays a message of congratulations and the castle then takes off.

Matt, Tiptree

Spy Hunter

IN **Spyhunter,** when the helicopter comes along, go up behind and stop level with it. The copter fires bombs which blow up just before they reach you. While that is happening your score slowly ticks on.

Andrew Graham, Lancaster



Boxing clever with Frank Bruno

A FEW hints from the boys at Elite to help you fight your way to the Heavyweight Championship of the world, in **Frank Bruno's Boxing:**

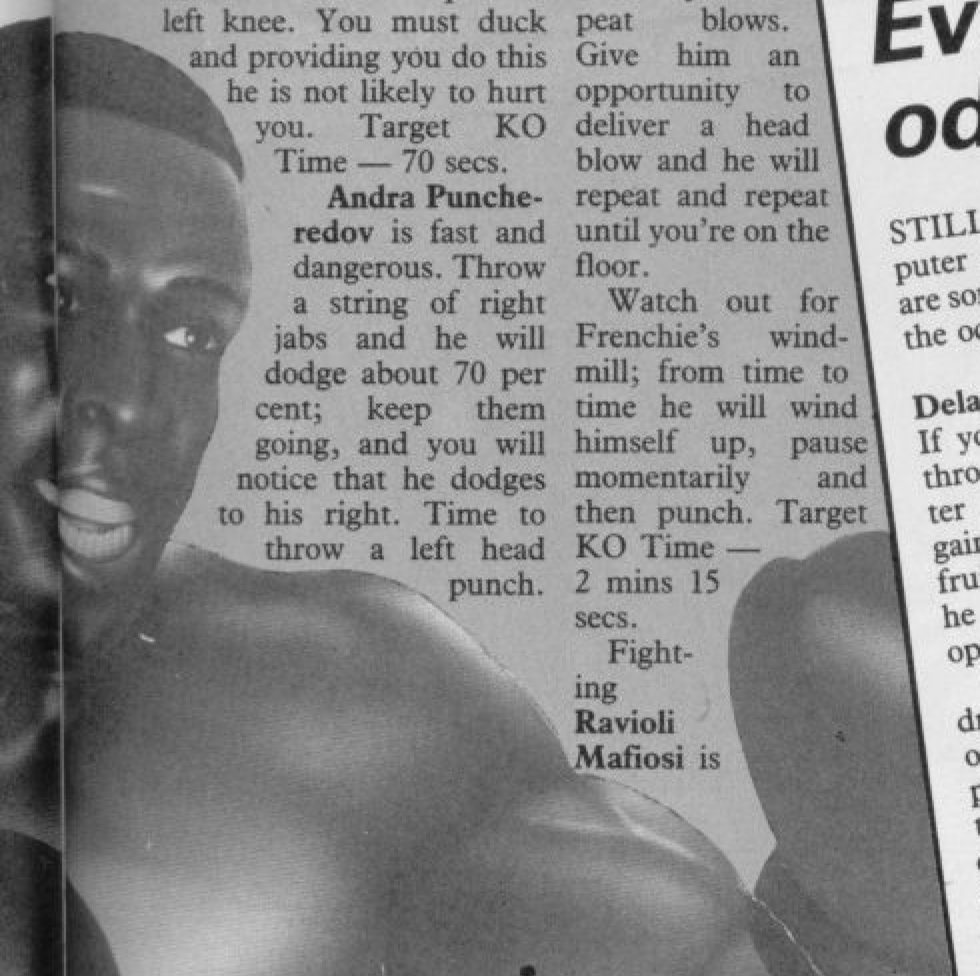
Canadian Crusher reacts to your punches; deliver a body blow and the big dumbo will drop his guard to protect his body, switch now to the head and up will come his hands.

Watch out for his right uppercut — with practice it's easy to avoid. Each time you knock him down, Crusher will attempt the bear hug, and to avoid him you must duck. Target KO Time — 35 secs.

Fling Long Chop can dodge your head punches, he can also block head and body blows. The best tactic is to fight like fury and throw as many punches as you can.

Each time he delivers a head kick he will drop to his left knee. You must duck and providing you do this he is not likely to hurt you. Target KO Time — 70 secs.

Andra Puncheredov is fast and dangerous. Throw a string of right jabs and he will dodge about 70 per cent; keep them going, and you will notice that he dodges to his right. Time to throw a left head punch.



Watch out for dirty tricks; Andra will headbutt if he gets the chance, and if his head goes back, duck. Target KO Time — 1 min 45 secs.

With **Tribal Trouble** each punch you throw will bring instant retaliation. So wait, with your guard down, and as he raises his fists to strike, deliver a body blow. You won't be able to hit him twice, so block his body blows and wait until once more he raises his guard.

You will notice that Tribal Trouble goes into an Ali shuffle; don't under any circumstances hit him when he is in the down position as this will trigger his two-handed punch. Target KO Time — 2 mins.

Frenchie is difficult to hit and not terribly exciting. One aspect of Frenchie's style worth noting is his tendency to repeat blows. Give him an opportunity to deliver a head blow and he will repeat and repeat until you're on the floor.

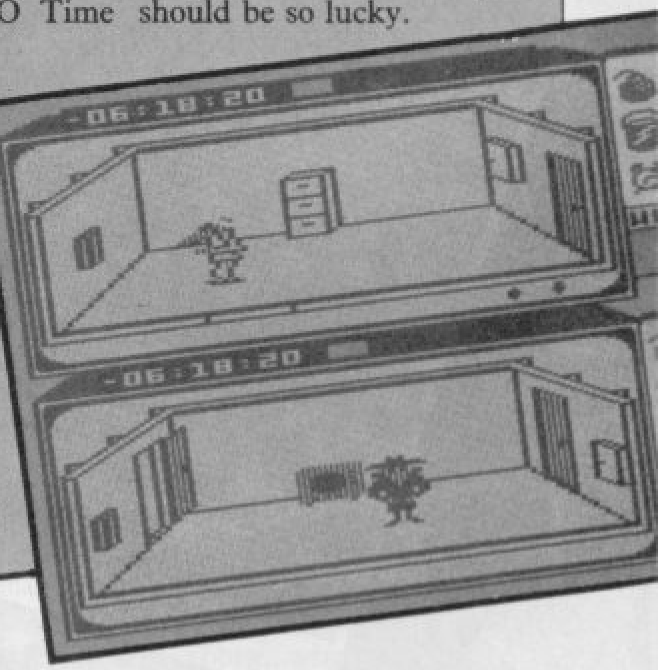
Watch out for Frenchie's windmill; from time to time he will wind himself up, pause momentarily and then punch. Target KO Time — 2 mins 15 secs.

Fighting **Ravioli Mafiosi** is a battle of wits. His only weakness is a tendency to drop his right hand; at that point punch with your right. Ravioli will at first block with his left but after some blows his left will fall away and you're through. Don't fall for the come on, or the ending will be instantaneous. Target KO Time — 2 mins 30 secs.

Antipodean Andy has one chink in his armour — when he leans to the left you can catch him with either a righthand head blow or a lefthand body blow.

Immediately prior to unleashing a double fist punch Andy will raise both hands over his face. Target KO Time — 2 mins 45 secs.

Peter Perfect is almost impossible to beat. You cannot land the, by now all too familiar, righthand knockout drop; Peter sees it coming and dodges, every time. Target KO Time — you should be so lucky.



Even the odds in Spy vs Spy

STILL can't beat the computer in **Spy vs Spy**? Here are some tactics for reducing the odds.

Delaying tactics

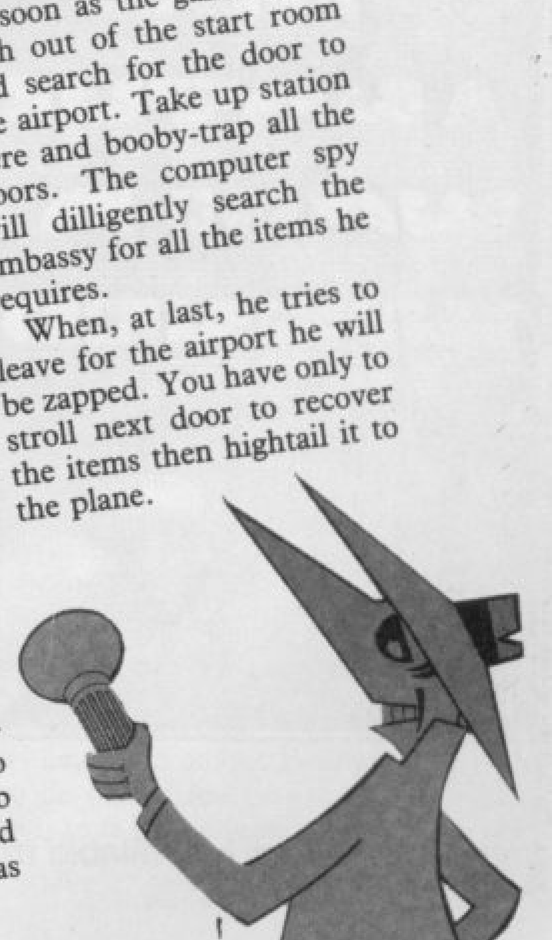
If you stand before a door through which your computer opponent is trying to gain entry he will struggle fruitlessly, and eventually he may trundle off in the opposite direction.

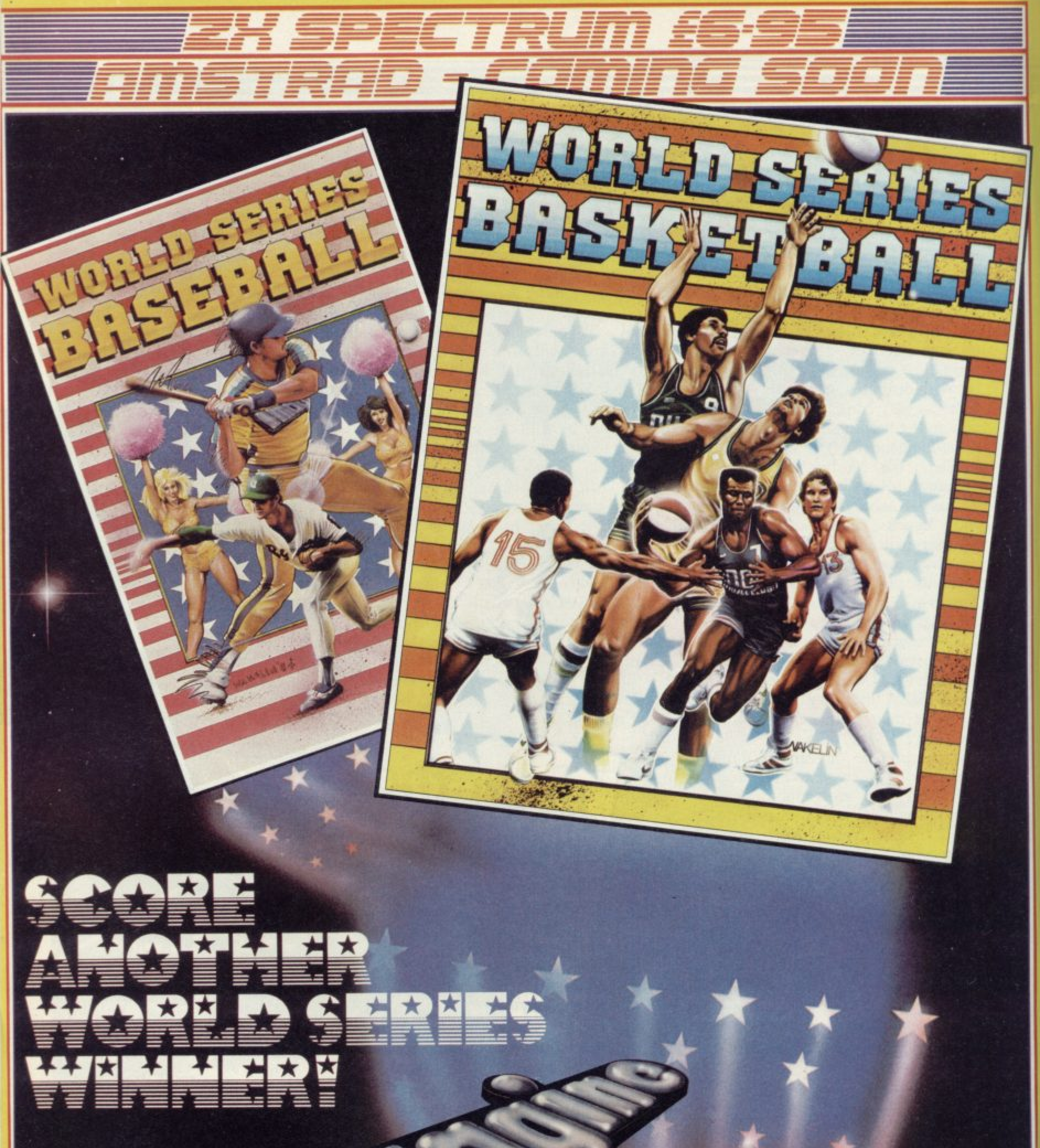
You can make this more dramatic if, as soon as your opponent tries to enter, you produce a time bomb. Count to ten, then rush for an exit door. Take up station just beyond the threshold. The computer spy will probably pursue you into the time-bombed room. As he tries to enter your room the bomb will explode. Run back and gather any items he has dropped.

The airport gambit

As soon as the game opens rush out of the start room and search for the door to the airport. Take up station here and booby-trap all the doors. The computer spy will dilligently search the embassy for all the items he requires.

When, at last, he tries to leave for the airport he will be zapped. You have only to stroll next door to recover the items then hightail it to the plane.




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Imagine
..the name of the game

SINCLAIR USER Classics are programs which, in our biased and eccentric opinion, set new standards in software. They are the programs by which the others should be measured. If you buy no other software, buy these. No self-respecting Sinclair user should be without them.

Software reviews carry a star rating, the basis of which will be value for money. Programming, graphics, speed, presentation, addictive qualities and the rest are taken into account.

Guide to ratings
★★★★★ 24 carat. Buy it
★★★★ Value for money
★★★ Nothing special
★★ Over-priced
★ A rip-off

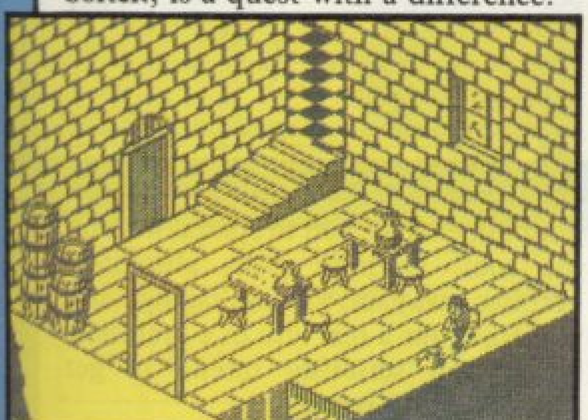
EXCLUSIVE

Fairlight

ACROSS THE Incredibly Flat and Featureless Plain, on the other side of the Impenetrably Thick Forest, just beside the Stream that Dries Up In The Corner of The Map sits the Enchanted Castle.

Haven't we had enough of them, after **Avalon, Knight Lore, Dragontorc**, and **Tir na Nog**? OK, so the setting of **Fairlight** is not promising. There's a wizard locked up in the castle and you have to find a magic book to release him and save the great gizmo from going ape with the wotsit.

Don't worry. When you actually get inside the castle you'll forget about how bored you are with fantasy. **Fairlight,** from The Edge, a division of Softek, is a quest with a difference.



The difference is largely in the graphics. They are the best we have seen of the two-colour 3D variety, streets ahead of **Knight Lore** and **Alien 8** for variety and elegance of design. There are stairways and catwalks, corridors and chambers, trapdoors and courtyards in the castle; mapping **Fairlight** is going to be a problem, as the castle is designed like a castle, not a chessboard with a lot of walls between the squares.

Your character is an adventurer, cloaked and armed with a suitably workmanlike orc-sticker for those embarrassing social encounters. The figure moves in four directions and can jump, pick up objects and fight. It does those things a lot faster than Sabreman, whose antics are beginning to look decidedly creaky against this new wave of arcade-adventures.

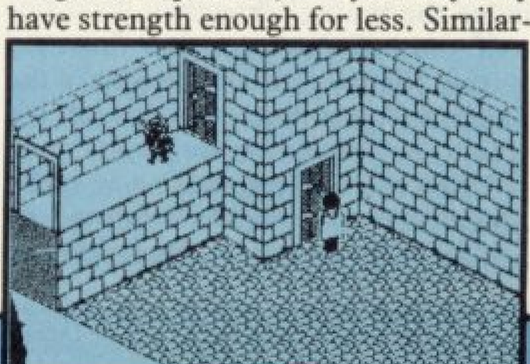
You can push objects around as well, stack chairs on tables to get at high doors or windows, and generally derange the furniture at your pleasure. But the problems have a more naturalistic quality than usual. Keys tend to fit doors — somewhere — and performing various sequences of action will reveal further depths to the castle

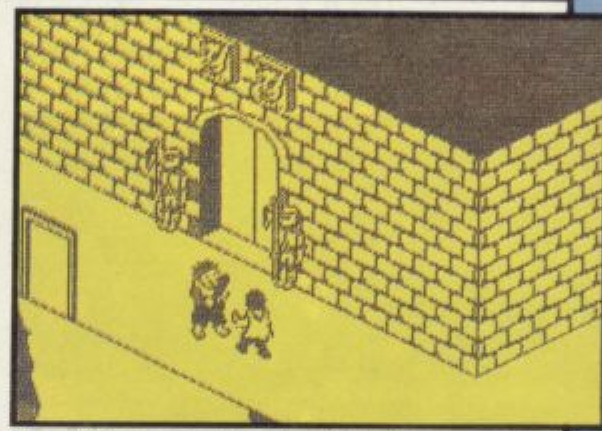


as secret doors are opened.

Monsters include guards and trolls, club-wielding heavies who can be fought or outwitted. Realism in the fight sequences includes comparisons of strength.

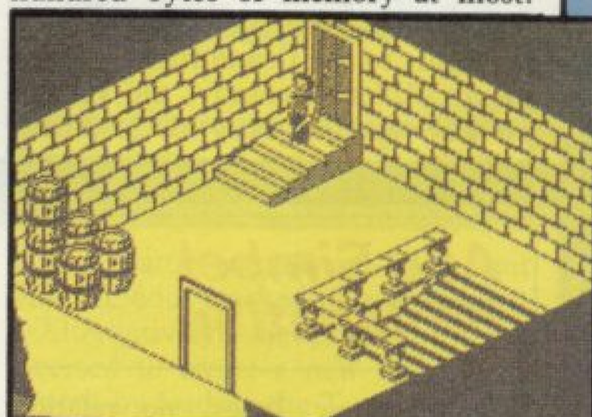
In fact, every object and character in the game has a weight. Objects carried are displayed on a small scroll tucked away in the corner of the screen, one at a time — the one you have selected to hold. You can carry up to five objects altogether, but the weight is important, and you may only have strength enough for less. Similarly, 300 pounds of gibbering green trollflesh packs a bigger punch than one wimpish little prison guard.





Fairlight is to be the first of a trilogy of games set in the land of **Fairlight** and future games will take the player into the surrounding countryside.

The secret of the stunning graphics is Grax, a high-powered low-level graphics language developed by Softek. Bo Jangeborg, who is currently putting the finishing touches to **Fairlight,** uses Grax to develop complex screens which occupy only one or two hundred bytes of memory at most.



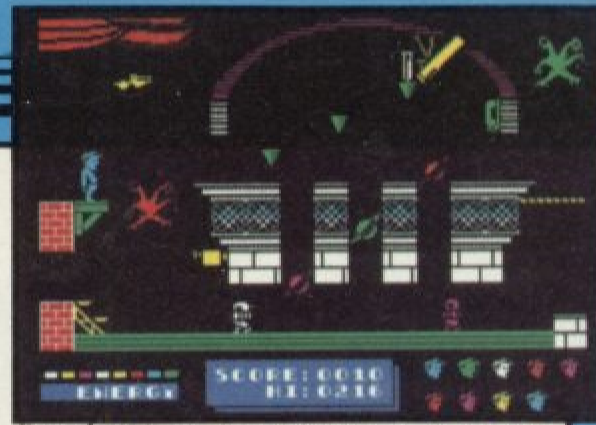
Softek originally thought in terms of a 35 screen game but the finished product could contain up to 100, depending on Bo's stamina.

Tim Langdell, manager director of Softek, says Grax uses adapted core routines from **The Artist**, a graphics package reviewed elsewhere in this issue. But he's thinking about releasing Grax in the shape of an arcade-adventure design package.

Meanwhile, watch out for **Fairlight.** it's got to be one of the best arcade-adventure quests of the year.

Chris Bourne

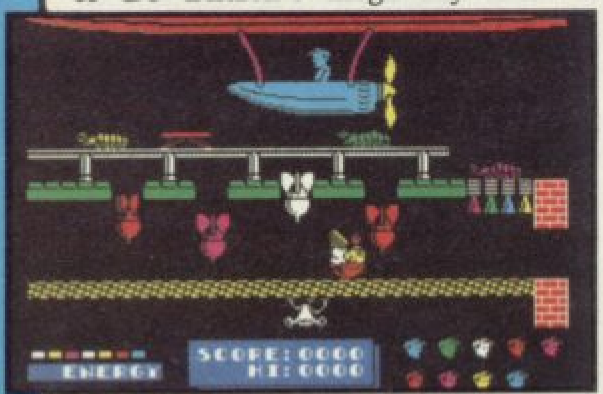
more software on page 18



Dynamite Dan

EVERY platform game released compares itself, and is compared to, **Jet Set Willy.** Most, of course, come nowhere near. **Dynamite Dan,** however, surpasses it.

The plot, as usual, is disposable. For what it's worth, Dan is a secret agent sent to steal the top secret plans of Dr Blitzen's mega ray from a mountain top hideaway.



The house is infested with lethal mobile thingies, and Dan must avoid those as best he can while all the time collecting sticks of dynamite and consuming the scattered munchies. Points are scored for food eaten and objects amassed; test tubes score highly as well as giving extra lives.

A lift will take you to various levels before depositing you above the waters which run below the house. Those can be navigated with a raft, though once on it you must keep walking to stop falling off, and stategic hops are necessary to avoid flying birds and insects.

Dotted around the building are trampolines, useful for reaching inaccessible ledges but decidely dodgy to negotiate, and teleporters which transport you to other rooms.

Such a straightforward description does little to convey the horrifically addictive nature of the game, but only a few minutes play will have you beyond redemption. The graphics are all they should be; large, colourful and free of flicker. The obligatory irritating music is present too.

Scoring virtually no brownie points for originality, the game is nevertheless well set to be the platform game of the summer. Forget **Jet Set Willy II** and fork out the folding stuff instead for **Dynamite Dan**. *Bill Scolding*

Publisher Mirrorsoft **Price** £6.95
Memory 48K **Joystick** Kempston, Sinclair, cursor
★★★★★

Paws

IN THE June issue of *Sinclair User* we reviewed Cats from Artic, a super little maze game based on the alleged musical by Andrew Lloyd Webber.

There were in fact problems we didn't notice. In the first place, the game wasn't going to be called Cats after all because Artic failed to obtain the rights to the theme from Andrew Lloyd Wallet. Secondly, the version we saw was an early development



version, and very much easier than the final game was ever intended to be.

You have to travel a giant **Sabre Wulf**-style maze searching for your 10 lost kittens, and hunting down or avoiding the bully dogs who prowl the midnight streets.

You're armed with fur-balls and stun powder which knocks out the dogs for a short time. Food and ammunition for the fur balls is dotted all around the maze.

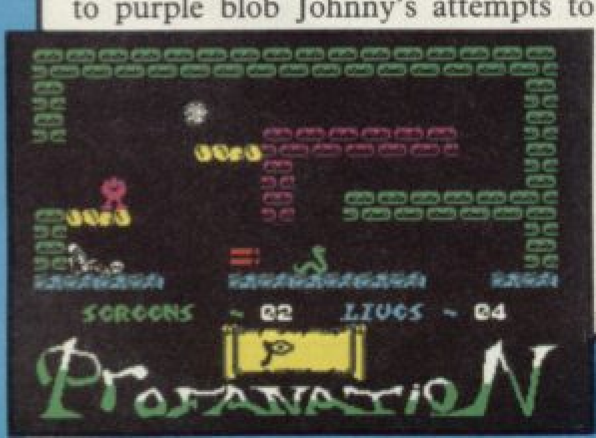
The game is certainly a challenge in the final version, and very difficult to beat, even on the easiest of five levels. The graphics are colourful and the theme effective. *Chris Bourne.*

Publisher Artic **Price** £6.95
Memory 48K **Joystick** Kempston, Cursor, Sinclair
★★★★

Abu Simbel Profanation

MEET Johnny Jones, no relation whatsoever to Indiana. It is clearly coincidence that Johnny also spends his time leaping through the death traps of a forbidden Egyptian temple.

Spanish software house Dinamic has licensed its successful game to Gremlin Graphics so we too can thrill to purple blob Johnny's attempts to reach the mortuary and free himself from the curse of Ramses II.



We are not told whether he's a purple blob because of the curse or because he was born that way, but who cares? **Profanation** is a viciously difficult jump-and-dodge game, programmed in vivid graphics which lift it above the usual run of **Manic Miner** bandwagon passengers.

You will have to be pixel-perfect to surmount some problems. The acidic drops which abound in the cavern complex can usually be jumped if you judge the timing correctly.

If you still can't get past them try getting Johnny right on the edge of the platforms, just out of range of the splash, before you jump.

Later you will discover some really filthy tricks — there are sections of ceiling, two on screen three, where jumping enables you to spider-walk on the roof. Gremlin gives absolutely nothing away in the packaging, and you are in for a real lulu of a brainbuster if you seriously intend to get through all 45 screens.

While there is nothing particularly original about **Profanation**, it is one of the best we have seen. *Chris Bourne*

Publisher Gremlin Graphics
Price £7.95
Memory 48K **Joystick** Kempston
★★★★



The Artist

GRAPHIC design will never be the same with the arrival of **The Artist**, a Picasso of utilities.

Its comprehensive and exceptionally powerful design capabilities provide all you need to produce full colour high resolution screen pictures.

The package is rigidly structured using three main, and a number of subsidiary, menus.

When first loaded two cursors, a dot and a cross, are shown on the screen. Using the keyboard, or joystick, the dot cursor can be moved around in relation to the cross. If the CAPS SHIFT key is pressed the cross moves to a position over the dot which can then be moved around again. The cross, therefore, acts as a static reference point for any drawing that the dot cursor may do.

The dot cursor represents the brush and its size and drawing texture can be altered using Brush and Brush Pattern options respectively. Text can also be produced by the cursor from eight different fonts.



The second major menu provides basic drawing commands and operations. Unlike other packages on the market, it does all your work for you.

Lines, boxes, arcs, circles and ellipses can be produced with the



minimum of fuss using the cross cursor as the first reference point and the dot as the second. Shapes can be filled with a Spectrum designed texture or one created using UDGs.

The shapes must, however, be made up using a complete border. There must be no holes in it or the fill texture will leak out.

Overlay is one of the most powerful, and unique, features of The Artist. It has four functions. The first allows the user to trace a section of a picture, cut it out of that section and transport it to another part of the display. Parts of the picture can also be scaled up and down on the x or y axes.

The author has also included an advanced UDG generator and animator. It uses the eight character sets available through the utility.

Images can also be mirrored and rotated. Once a sequence of frames has been created it can be animated in a four or six step sequence.

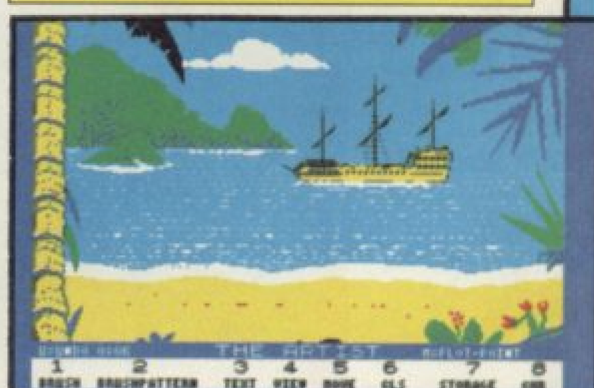
The generator is easy to use and it took me just 10 minutes to produce a four frame animation of a walking figure.

Full screen pictures can take up a lot of RAM memory so the author has included a routine which will hack down the amount of RAM required. The Compressor is a separate routine on the tape. All you have to do is load your picture into it. The program will then optimise storage needs.

The Compressor works at its best and most visibly with complex pictures using colour to the full. It is an intelligent utility and, of course, affects only the memory requirement and not the picture on the screen.

The power of the line generation and pixel commands, coupled with the cut and paste facilities, and not forgetting the UDG generator, makes **The Artist** one of the most powerful graphics aids. *John Gilbert*

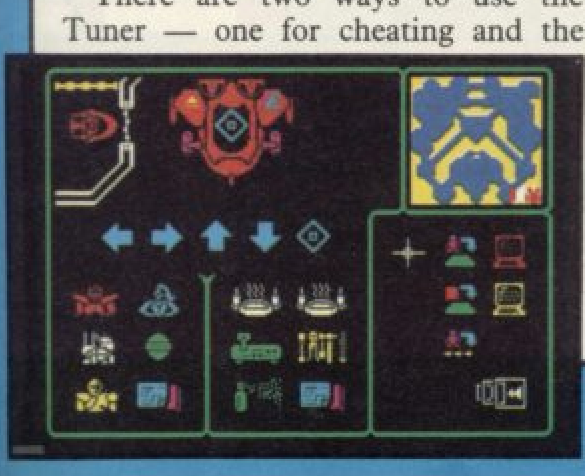
Publisher Softek **Price** £12.95
Memory 48K **Joystick** Kempston
★★★★★



Shadowfire Tuner

BEYOND has come up with a cheap package which will prolong the life of the icon-driven adventure **Shadowfire** by allowing you an infinite variety of changes in the conditions of each game.

There are two ways to use the Tuner — one for cheating and the other to create a totally new game.



To cheat, play **Shadowfire** as far as you are able, then save your last position on a blank tape. Load in the Tuner and the save position — that only takes a few minutes and is very simple. Now start experimenting. You can give the Enigma team extra strength, agility and anything else you care to bestow on them.

You may want to move them to different positions in Zoff V — the enemy space ship — lock some doors and open others. Kill off some members and make others prisoners. You can even outline the routes the General's troops must patrol and in that way know which areas to avoid.

Once the changes have been made, save them and load up both **Shadowfire** and the alterations made with the Tuner. Battle commences again, but with the odds stacked in your favour.

Alternatively, the process can be reversed to create a new game from scratch by loading the Tuner, making the desired changes which should be saved and then loaded once **Shadowfire** is on screen.

The beauty of the Tuner is that any game can be made as complicated or simple as you please. It has been well laid out and is icon driven in the same style as **Shadowfire**. Once you've got the hang of the instructions it is easy to implement. *Clare Edgely*

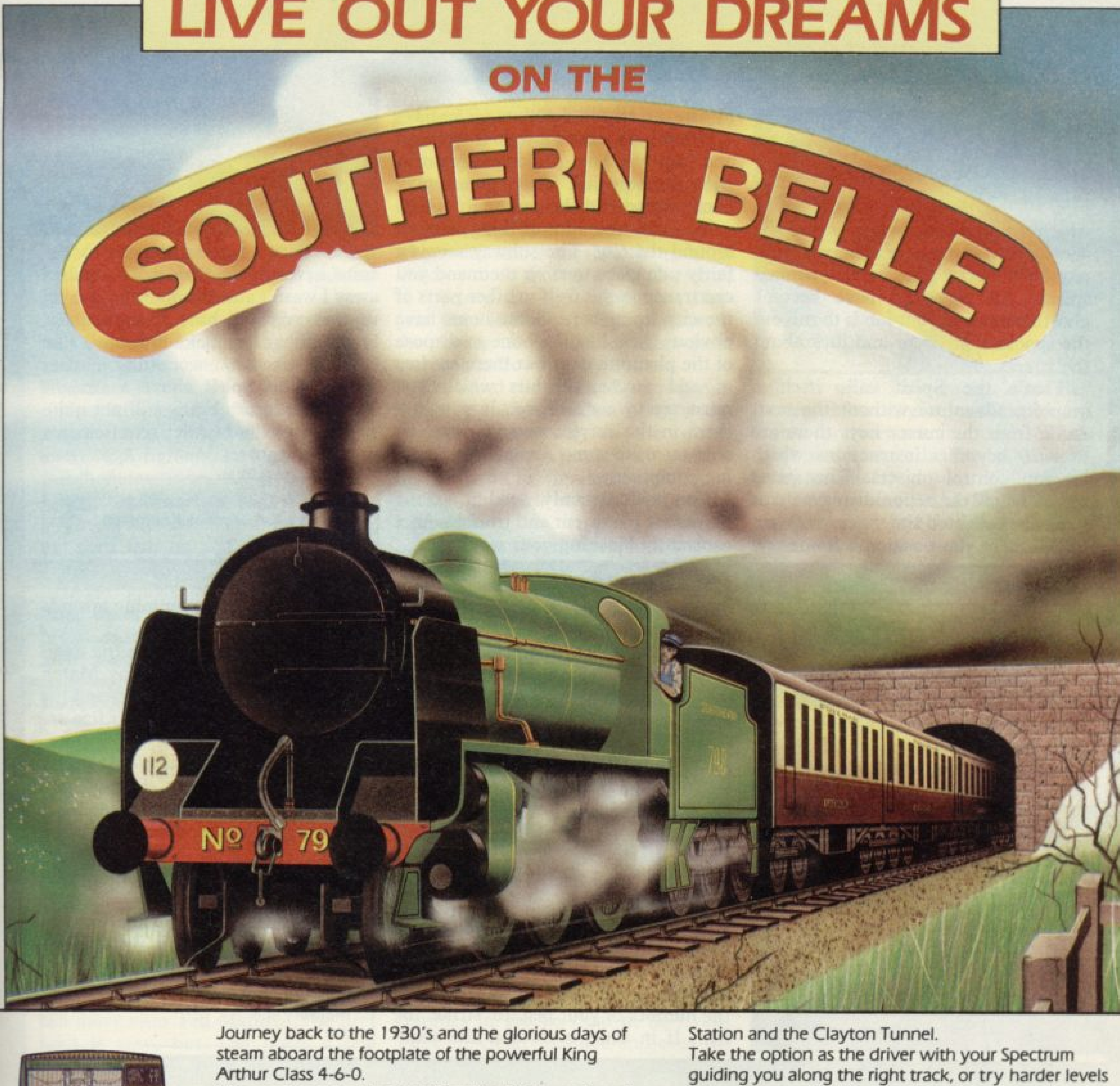
Publisher Beyond **Price** £3.50 mail order
Memory 48K **Joystick** Kempston, Sinclair, Protek
★★★★

more software on page 22

LIVE OUT YOUR DREAMS

ON THE

SOUTHERN BELLE







Journey back to the 1930's and the glorious days of steam aboard the footplate of the powerful King Arthur Class 4-6-0.

You can almost feel the heat from the firebox and smell the billowing smoke when you thunder along the famous London to Brighton run.

Using the footplate controls and gauges you will tow the Pullman carriages from Victoria to Brighton in 60 minutes. Any delays will ruin your timetable, so keep an eye on your stocks of water and coal – you can check the efficiency of your coal burn by the density of the smoke. Your present speed, time and the position of the next signal for guidance are also displayed.

Wipe the soot from your eyes and peer out of the cab to pick out the 24 stations as they rush by. Look out for other well known landmarks such as Battersea Power Station and the Clayton Tunnel.

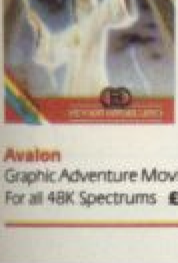
Take the option as the driver with your Spectrum guiding you along the right track, or try harder levels where you are the driver *and* the fireman, perhaps facing adverse conditions that could make you disastrously late!

Realistic controls such as the regulator controlling the flow of steam to the cylinders, the damper controlling air flow to the fire, vacuum brakes and the fire doors, plus authentic moving graphics and sound, make Southern Belle second only to the real experience.

You have steam up, there's a strict timetable, the Southern Belle is all yours.

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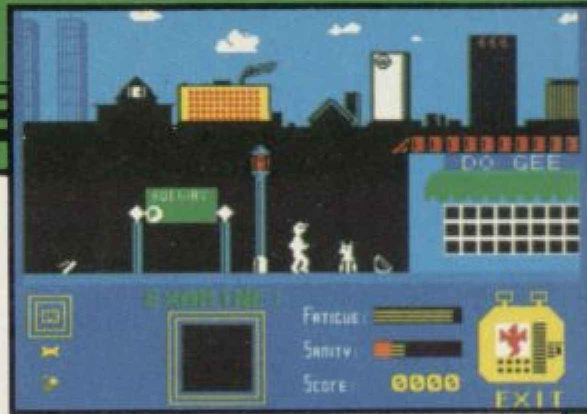


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That's the Spirit

IT'S 1996 in downtown New York — which could be anywhere since the World Government renamed every city New York. They've also banned spirits. All the cops have become ghostbusters and your job is to rub out the spooks that flitter and lurk about the streets.

That's the Spirit calls itself a graphics adventure without the text. Aside from the cursor keys there are over 20 keypress instructions which let you control objects. The status screen below the action displays items you have collected and when you want to use them you position a frame and key in the required action.

Other indicators show your strength and sanity. Any prolonged contact with a ghost will drive you totally bananas and end the game.

You will find a lot of things strewn around the city. The subway seems a fairly safe place to store them and you can transport yourself to other parts of the city from there. Some items have obvious uses, like the bone to dispose of the phantom dog, but there are lots of odd mechanical bits which you must try to connect up. If you link them in the correct way you may be able to make some decent ghostbusting equipment.

You will certainly need it as the ghosts are persistent and troublesome, constantly blocking your way.

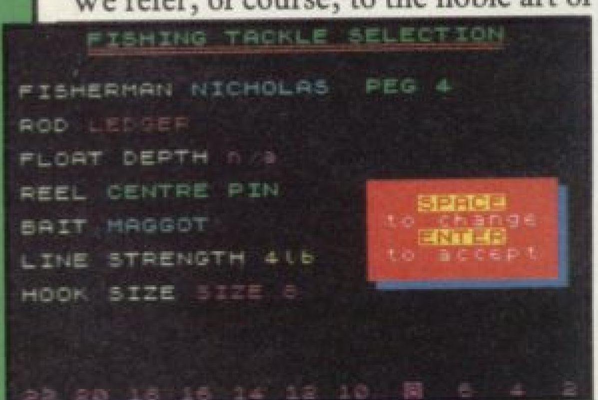
Ghostbusting is no doddle — despite having about 15 items stashed away I wasn't able to connect anything up and you will have to experiment long and hard to make link-ups.

That mental worritting raises **That's The Spirit** above a straight arcade adventure but is still not quite the same as the broader requirements of text adventure. *Richard Price*

Publisher The Edge **Price** £7.95
Memory 48K **Joystick** Kempston
★★★★

Jack Charlton's Match Fishing

IT HAD to happen. It was about the only sport hitherto unsullied by the attentions of computer programmers. We refer, of course, to the noble art of the angler, or, to give its title in full spin-off rent-a-celebrity glory, **Jack Charlton's Match Fishing.**



Any computer version should reflect the numbing boredom so beloved by anglers, and to an extent **Match Fishing** succeeds. You play with up to eight fishermen, or on your own. You are allocated a 'peg' — a section of water to fish — and must choose the appropriate tackle, rod and bait for the spot and the species you reckon might live there. You also choose how far to cast.

Having chosen your tackle you watch an idyllic screen of lake, mountains and green banks. When a bite is registered, you lunge forward to press the number of your peg, to 'strike' the fish. If in time, a cartoon-like sequence involves a fish swimming towards the line.

As a solitaire game, only the dedicated angler is likely to enjoy **Match Fishing.** With several players, and the inevitable scramble for keys if fish are biting, the game becomes more fun.

The problem is that if you don't know anything about fishing you won't get much out of the game. And the dedicated angler, who might enjoy the game greatly, is going to be spending his spare time out there with the midges and the stinky maggots and the dead swans and the crate of Newcastle Brown. *Chris Bourne*

Publisher Alligata **Price** £7.95
Memory 48K
★★★

Nick Faldo's Open

WITH remarkable originality Argus has produced a golf game. Not just any golf game, you understand, but Nick Faldo's absolutely faithful Open with stunning 900 screen map.

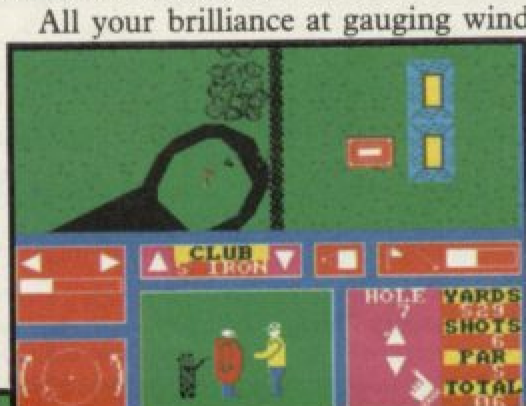
The screens show the Royal St George's golf course, venue for the 1985 British Open. A close-up of your position is given, with controls for selection of club, direction of shot and strength. There's a picture of the golfer and a portly caddy who hands him the clubs and makes sarcastic comments on your lack of prowess.

All these selections are icon-driven, with a little hand which you move round the screen until it points at the option you want.

The map shows the familiar mildewed carpet of golf simulations, with black fairways and smooth greens.

Approach shots are OK, but when you reach the green, even the magnified view cannot show what is happening. The closer you get to the hole the more difficult it is to judge direction, which is ridiculous.

All your brilliance at gauging wind and whatnot to reach the green in two on a par five hole goes for nothing as you miss five two-foot putts on the trot. It also seems weird that a full-strength putt may not carry to the hole.



It is certainly one of the prettiest and friendly Golf games we have seen, though a real test of player and programmer would be the inclusion of contours and sloping greens.

If you must buy a Golf simulation for ten quid then Argus has a very pleasant game it would love to flog you.

Chris Bourne

Publisher Argus **Price** £9.99
Memory 48K **Joystick** Kempton, cursor, Sinclair, Fuller
★★★

Frank Bruno's Boxing

THREE boxing games have been released simultaneously – all based loosely on **Punch Out!!** which is doing so well in the arcades.

Coming out on top is **Frank Bruno's Boxing** from Elite, more realistic and enjoyable than both **Rocco** and **Knockout**.

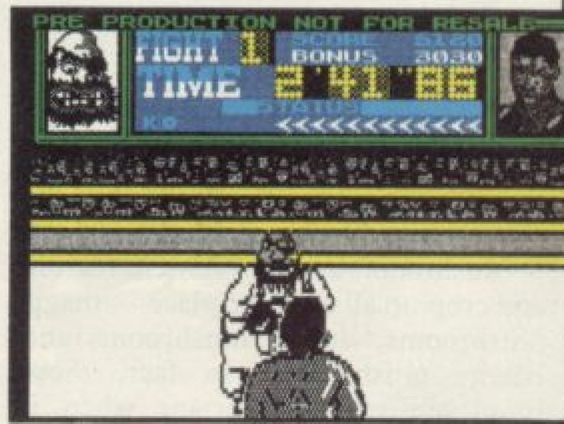
You have eight fights, before you are proclaimed world champ, against many top fighters including Andra Puncheredov from USSR and Fling Long Chop from Japan.

The two boxers step into the ring, put their fists up and the fight is on. Ducking, slugging and dodging you have to knock out your opponent three times in a three minute round, before moving onto the next bout. A high score championship table adds excitement to the game and is a feature lacking in the other boxing software contenders.

Rather unfairly, your opponent can throw right hooks and uppercuts at will, whereas you can only throw those when the knockout bell is ringing. When you do deliver a KO the result is spectacular – your opponent staggers then keels over. In comparison, the boxer in Alligata's **Knockout** merely sits down.

Keyboard control in all three games is more satisfactory than using a joystick, and especially in this game. There are eight separate moves which are difficult to simulate with a joystick, though simple with the keyboard.

The monochrome graphics are inferior to those in **Rocco**, but are reasonably defined. Of the three, **Frank Bruno's Boxing** is the most faithful version of the original arcade game, including the same scoring system.



As usual your energy decreases for each blow received and marks are scored for every correct punch. When those marks reach the KO bell you can go in for the kill.

It's a pity that Frank Bruno isn't a two player game but if you are into vicarious violence – buy it. *Clare Edgeley*

Publisher Elite **Price** £6.95
Memory 48K **Joystick** Kempston, Sinclair
★★★★

Rocco

FROM Gremlin comes your second sparring partner, **Rocco**. Your boxer has his back to the screen and his opponent facing outwards. Blood, sweat or teeth fly — you can't be sure which — every time a punch goes home.

In the first fight, Cimbel-Lin must be knocked out three times before you can move onto Ted Mature. The first bout is easy, but Ted poses a few problems. Next, bludgeon your way past Jansen Sino to take on Fighting



Bull — a Mr T lookalike with fists like sledgehammers.

More care has been taken over the graphics in **Rocco** than in its rivals. They are clearly defined and even the faces are expressive. However, the perspective makes your player look like a dwarf compared with the massive bulk of the contender. That gives you a clearer view, but it does appear to be an unbalanced fight.

It is almost impossible to defend yourself properly using the joystick and not much easier with the keyboard. You can neither dodge from side to side nor duck.

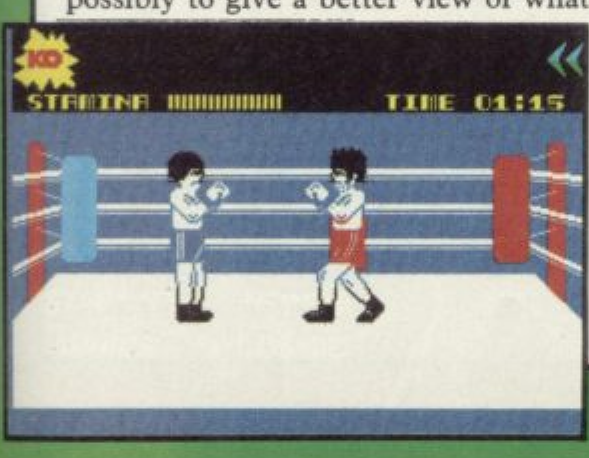
Rocco is not wildly addictive and once you have mastered the controls, it soon loses its initial impact. Very much an also-ran. *Clare Edgeley*

Publisher Gremlin **Price** £7.95
Memory 48K **Joystick** Kempston
★★★

Knockout

ALLIGATA'S fighter, **Knockout**, shouldn't even be in the same ring as **Frank Bruno's Boxing** and **Rocco**.

It is the only game in which the two players fight in profile and in colour; possibly to give a better view of what each is doing to the other. If that is so, it fails miserably.



You play the overweight Italian Stallion versus Slugger Sam. Standing motionless in the middle of the ring, they try for knock out. Your strength decreases every time you are hit and after a few taps the Italian Stallion sits down while four stars flash above his head. Even a KO isn't realistic.

Knock down Sluggish Sam three times and you can load up the Bald Bull. If the punishment is too severe you can at least stroll away but you cannot dodge or duck. To make matters worse, Italian Stallion seems to be one handed. His left arm hardly twitches — not much help.

With the joystick there is another disadvantage. It is easy to throw a head punch but body punches are more difficult. The scoring system seems unnecessarily complex — a simpler system would be more in keeping with the limitations of the game.

If **Knockout** had been released a few months ago it might have done well; as it is it will scarcely go one round with its muscular opposition. Described on the cassette inlay as 'the fight of the century', it might be better termed 'the worst fight of the century'. *Clare Edgeley*

Publisher Alligata **Price** £6.95
Memory 48K **Joystick** Kempston
★★

more software on page 24

On the Run

THIS is a hybrid game combining features from **Sabre Wulf** and the more recent **Nodes of Yesod**.

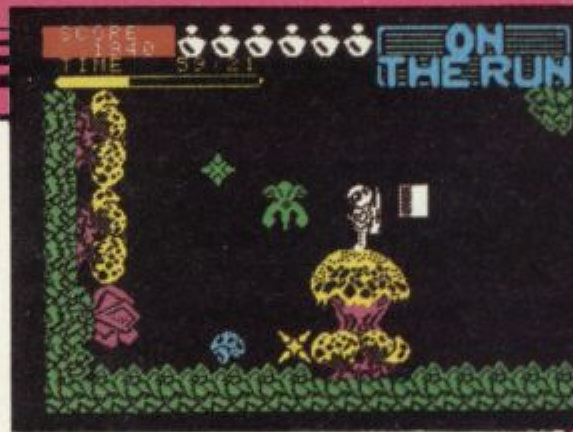
Mushrooms are a prominent feature and crop up all over the place — magic mushrooms, deadly mushrooms and energy mushrooms. In fact, those fungi are most important when it comes down to finding six cannisters of a deadly chemical from the depths of a jungle maze.

You have only one hour in which to complete your mission and retrieve the chemicals — no easy task as there are a variety of mutants, gnashing teeth and star fish out to kill.

Various indescribable objects will help or hinder your task. The cassette inlay suggests shooting anything which moves.

Much of the maze involves descending and ascending tunnels — here you are at your most vulnerable, falling between two narrow walls with little room to shoot the mutants. It is frustrating that you can only fire forwards and at varying angles but not up and down or behind you. That does make the game harder.

On the Run will take longer than an hour to complete at first and at the same time it is fun though unoriginal.



You have probably seen and played it all before, but if you like this type of challenge and want another variation on an Ultimate theme, then buy it.

Clare Edgeley

Publisher Design Design **Price** £6.90
Memory 48K
Joystick Kempston, Protek, Sinclair
★★★

Nonterraqueous

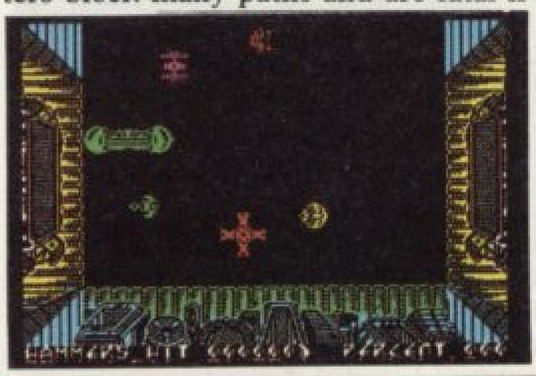
SEND a robot seeker into an underground maze, find a computer console, blow it up and you've saved the planet.

The theme of Mastertronic's **Nonterraqueous** is all too familiar and bears some resemblance to all other maze games of the same ilk.

Once you've got your magnifying glass out to read the instructions, you will see that the game is all about keeping your psyche levels up. Some objects will give you psyche, others decay psyche — when you have no psyche left, you are dead.

Start off point seems to be around level 40. The robot, a little metal blob, whisks into the air and the search is on. Blast away at a few flying aliens and find a bomb.

When detonated, that blasts a hole through one of the electric fences which bar your passage. Photon thrusters block many paths and are fatal if



touched. They also tend to come in twos and are the most frustrating aspect of the whole game.

Some objects carry the word Swop, which means you can go into defenceless mode. The robot turns into a helicopter which cannot fire and though that apparently has its uses, it is not needed in the early stages.

For all that, **Nonterraqueous** is fast with smooth graphics. Though not the most exciting game around, it is good value and should take some time to complete.

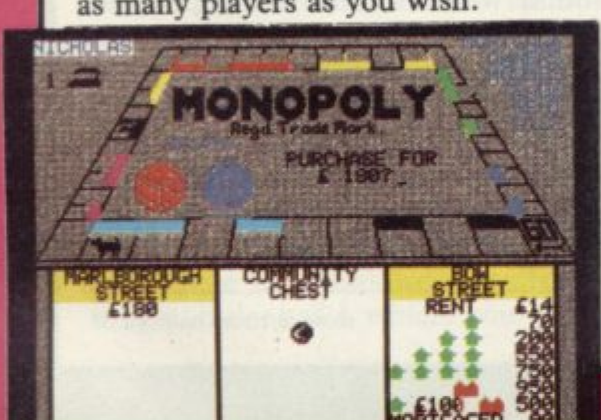
Clare Edgeley

Publisher Mastertronic **Price** £1.99
Memory 48K **Joystick** Kempston, Protek, Sinclair
★★★

Monopoly

MUCH OF MY misspent youth was devoted to playing *Monopoly*. It was never long before the board was awash with beer and property cards littered the floor. When the banker got bottled we all went to bed.

Leisure Genius, in its official version, has done its best to depict board, dice and deed cards. Up to six people can play, or the computer can control as many players as you wish.



The top two-thirds of the screen depict the board in 3D perspective over which the crudely drawn pieces move, often resulting in frightening colour clashes. Names are absent too, so you have to know the board by heart.

Much better is the scrolling bird's eye view which takes place below. As the pieces move the relevant squares march from left to right.

As you can't see what cards you or the other players hold, you have to call up the property menu to remind yourself that you really were foolish enough to buy the Electric Co.
The same applies for finding how little money you have left.

Trading is a farce. You must pinpoint the property you want to exchange, and the one you wish to gain, using a cursor which moves across the board. Again, as the squares are not named, you must remember exactly where your properties are, otherwise you will attempt to trade a property you might not even hold.

Trading between two computer controlled players is virtually never successful, as the computer will offer ludicrously small cash incentives — £141 for Mayfair, in one instance.

Buying houses and hotels is disappointing. As they do not appear on the board, you can't gloat over your row of terraced slum dwellings crowded on the Old Kent Road.

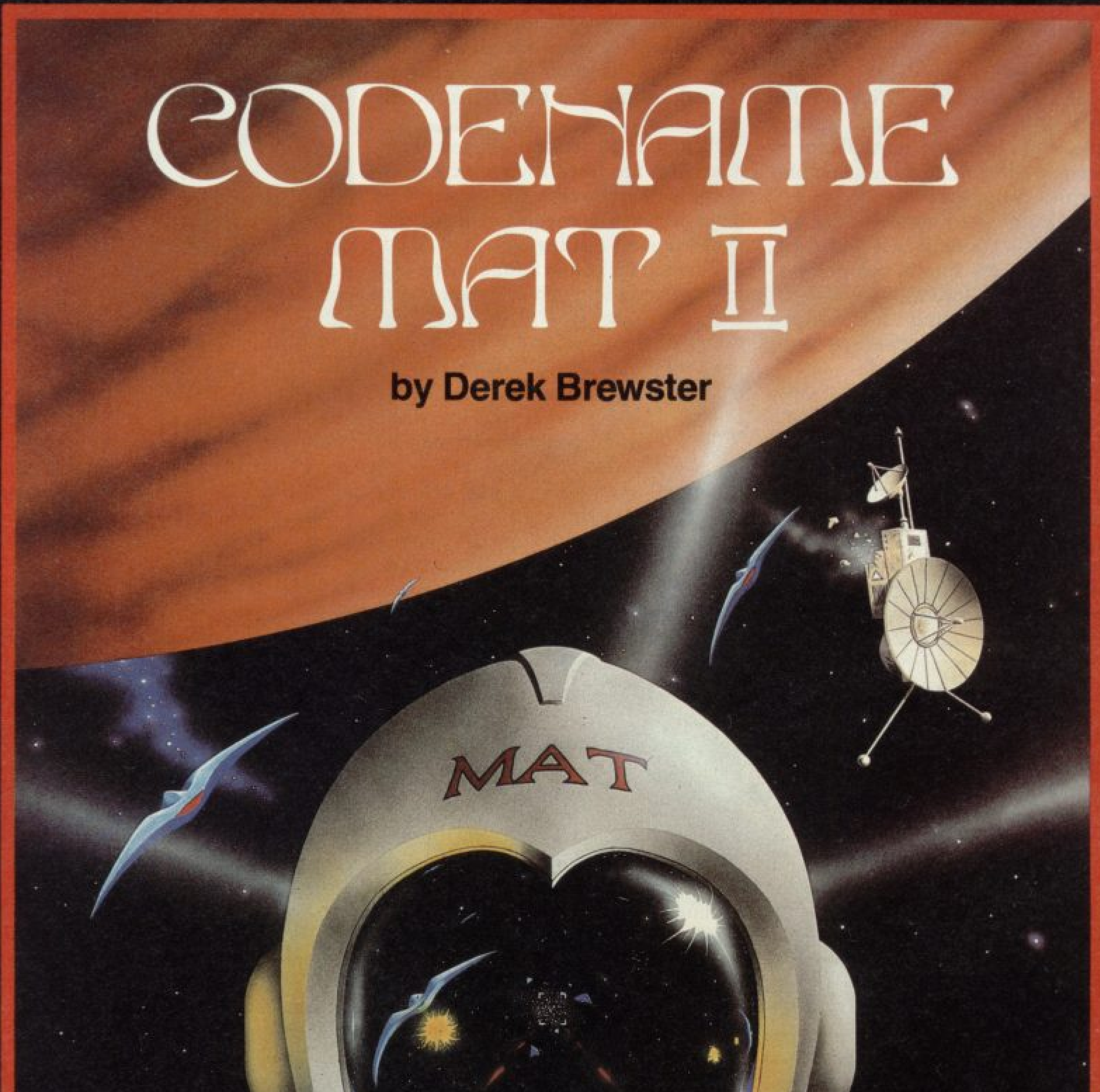
Just about the only reason for playing computer **Monopoly** is if you are a lonely addict adrift amongst inveterate Trivial Pursuiters. Beating the Spectrum offers little solace, however. And it's very boring.

Bill Scolding

Publisher Leisure Genius
Price £9.95 **Memory** 48K
★★

more software on page 26

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Cylu

ACCEPT the challenge. Dive into the bowels of a Spectrum and enter a purple world strongly reminiscent of Ultimate's **Alien 8.** In fact, game play is just the same too.

The Ostans need a new leader and to show your cunning, wit and logic, you are dumped into a computer to prove yourself. Twenty-four objects, including books and microdrives, must be collected and deposited at the I/O unit — the starting point.

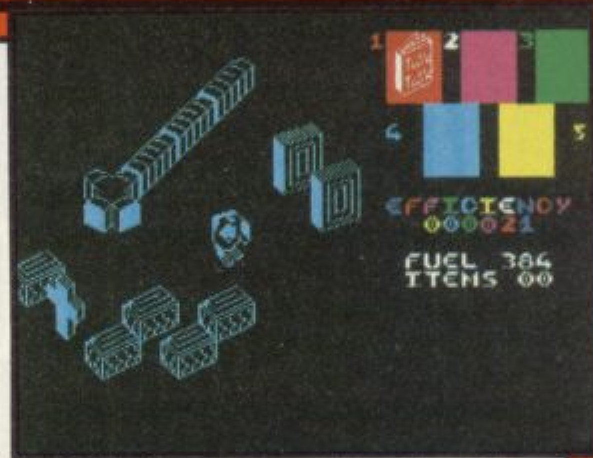
Many objects are hidden behind walls and approach from different angles is necessary to collect them. Only five objects can be carried at a time resulting in many trips back to the start.

A map is essential if you are to conserve fuel which quickly runs dry. Fuel containers are scattered in the early stages of the game — cunningly hidden amongst the debris. In later stages you will have to find the RFL — master refuel unit — which can be carried around and used when necessary.

Pick up all silicon chips. They neutralise the forcefields which block many paths through the maze. The fields are also numbered which helps with the map-making.

Further aid comes in the shape of a teleport network, which when accessed, will jump you to different sections. The only difficulty lies in finding the key to it. Return to base — RTB — takes you straight back to the I/O unit. However, if you carry the RTB and RFL, you will only be able to pick up three other objects.

The graphics, though well defined, are not as highly polished nor as detailed as those in Ultimate's masterpiece. You control a walking turtle shell — a many faceted blob — which



is difficult to recognise when first playing the game.

Firebird says **Cylu** was a borderline case for its Gold range and if the similarities to **Alien 8** were not so apparent it would have made it. However, it is an excellent copy, enjoyable and great value, and probably the best and most playable game in the Silver range. *Clare Edgeley*

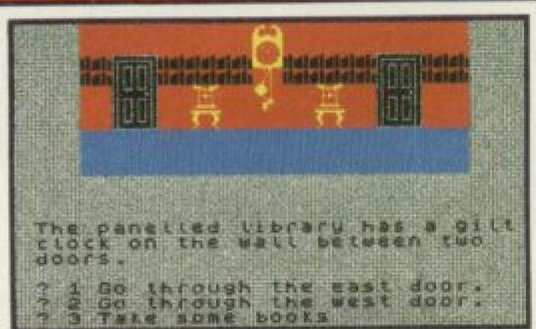
Publisher Firebird **Price** £2.50
Memory 48K
★★★★

Phineas Frogg

DESPITE being a *Toad of Toad Hall* lookalike, Phineas Frogg is a great deal more likeable. As the great detective he has to solve the mystery of scientist Mole's whereabouts in SLOTH — the Secret Lair of the Terrible Hamsters.

Adventure games have great appeal, but younger members of the family may not be able to spell well enough and tend to get stuck.

You have to guide Phineas around SLOTH, choosing from a selection of moves. That means that the keyboard



input is limited to numbers. The adventure can only be solved if the arcade sections are played.

Phineas needs a disguise and has to go fishing to get his fishmonger outfit. Fishing involves playing a **Frogger** type game. To get his scientist's white coat he has to solve the mystery of the cellars.

To help there is a story book, and a Top Secret envelope with a map and more clues.

The adventure is text with graphics and great fun to play, one of the very few games which have held the attention of the child testers for a number of sessions. We still have not solved the mystery, but have decided Mole is hidden down the mysterious locked corridor. The final mystery must be whether our boss Badger is really involved with the hamsters, and is a double agent. *Theo Wood*

Publisher Mirrorsoft **Price** £7.95
Memory 48K
★★★★

Action Biker

WHEN A budget software house gets into bed with a snack food manufacturer the consequences are likely to be pretty vile.



Mastertronic and KP have teamed up to promote a stunningly boring little number featuring Clumsy Colin, star of KP Skips packets.

The mindless storyline has somnambulist biker Colin scouring the town for his lost mate Marti. There are 150 houses; some he can't enter, some he can. Some have useful items, others don't.

The streets are liberally sprinkled with oil slicks and packets of KP Skips — the latter to be eaten, not avoided. Off the map is a dark region which Colin can only enter with a headlamp.

Why Colin is asleep is a mystery. The programmer was, too, by the looks of things. Too many collisions and Colin wakes up. You might wake up, too, and wonder why you're playing this jerky, flickery mess.

Following hot on the heels of Elite's dreadful Dunlop promotion, **911TS, Action Biker** signifies a depressing trend to link grotty software with expensive advertising campaigns. Let's kill this off instantly by refusing to buy such garbage.

Software like this gives junk food a bad name. *Bill Scolding*

Publisher Mastertronic **Price** £1.99
Memory 48K **Joystick** Kempston, Sinclair, cursor, Fuller
★

more software on page 28

Play THE GAME everyone's talking about:



BUSTERS

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perservere you wi
satisfying game.

Graphics: ****
Sound: ****
Playability: ****
CCI Rating: ****
Company: US G
Industrial Estate,
Birmingham. Te

It's 21.15 hours on the evening of May 16th, 1943. A flight of specially prepared Lancaster bombers is leaving R.A.F. Scampton for Germany.

After months of planning No. 617 Squadron are at last embarking on an operation destined to change the course of World War II.

Your objective is to destroy the Mohne, Eder and Sorpe dams, thus crippling Germany's industrial heartland.

This detailed and authentic simulation allows you to play the part of **PILOT, NAVIGATOR, FRONT GUNNER, REAR GUNNER, BOMB AIMER** and **FLIGHT ENGINEER.**

You fly at low altitude over Europe, on the lookout for deadly ME110 night fighters, dodging barrage balloons, searchlights and flak. At the target you'll need all your nerve and skill to control the aircraft and release your deadly payload whilst under enemy attack.

Game features include: **SUPERB GRAPHICS & SOUND · REALISTIC JOYSTICK CONTROL · PILOT'S SCREEN & INDICATORS · MULTIPLE SCREEN NAVIGATOR'S MAPS · FRONT & REAR GUNNER'S SCREEN · BOMB SIGHT SCREEN · ENGINEER'S INDICATORS.**

Game Package includes: Comprehensive flight instructions, maps and confidential documents including authentic material by Barnes Wallis and Wing Commander Guy Gibson.

U.S. GOLD All American Software

Sydney Development Corp.

Designed and Developed by Sydney Development Corporation. Licensed in conjunction with International Computer Group. Manufactured in the U.K. by U.S. Gold Limited, Unit 10, Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Telephone: 021-359 8881. Telex: 337268.

Ancient Quests

MIRRORSOFT produced a number of games which help with basic skills, but if you have not already bought one of those then **Ancient Quests** is a must.

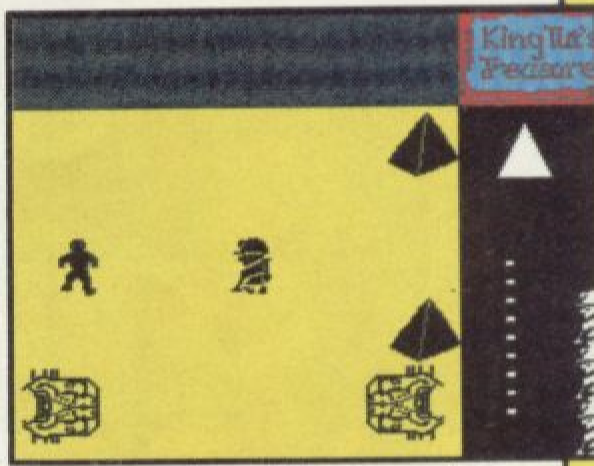
King Tut's Treasure is a game concerning matching shapes, matching fractions with names and decimals. This bald statement makes it sound like one big yawn, but the game is so cleverly designed as to overcome that problem, inherent in many educational games.

As Professor Diggins you have to search for the treasure over several screens. Having only a metal detector you must depend on the screen indicators as to the position of the treasure. When you are very 'hot' you can dig, and may find the matching shape or name. However there are hazards to avoid and played at the top speed the game can be very exciting.

In The Count you are in a castle and have to answer a number of questions on counting, or a choice of any mathematical operation. When that is done you go to the library, answer some more questions and, if correct, sunlight will pour in.

Both games are smooth in operation and have good graphics, and a choice of keyboard or joystick control. As a variety of skill levels is offered it will appeal to the 5-10 age group. It represents good value and the mixture of arcade action with content is just about right.

Theo Wood



Publisher Mirrorsoft **Price** £7.95
Memory 48K **Joystick** Kempston, Sinclair
★★★★

Metabolis

YOU HAVE the body of a bird but the brain of a human.

Well, none of us are perfect, and in **Metabolis** your feathered wimpness can nevertheless bring about the downfall of the evil macho Kremins by destroying their nuclear reactor.



Metabolis is a maze adventure with the usual dose of objects to collect and mutants to avoid. You control the Tweetypie character — a far cry from the fearsome fowl depicted on the cassette cover — in its quest to locate the four pieces of nuclear fuel necessary to blow up the reactor. Before you succeed in that, however, you must find the reversal serum which will transform you into a man.

Apples, fish, cake and other edibles must be consumed to prolong your life, and pills must be popped to prevent heart attacks. Other objects provide temporary defence against the maze's booby traps — picking up a 15 symbol, for instance, gets you past the boxing gloves, which otherwise send you hurtling backwards.

The slapstick cartoon humour is also evident when you get stomped on by the ton weights and hop around suffering from graphics compression.

The maze is large — 150 screens — and requires methodical mapping. Movement is fast and the Kremins plentiful. You can't zap them until you've chanced upon the magic boomerang, randomly hidden. Somewhere lurks a wizard, but I've yet to catch sight of him. And I still can't work out what the syringes are for.

Sufficiently addictive and tortuous, **Metabolis** isn't exactly going to set the software industry afire but it is considerably better than many others on the market. Good for a rainy summer's day.

Bill Scolding

Publisher Gremlin Graphics
Price £6.95 **Memory** 48K
Joystick Kempston, Sinclair
★★★

Buck Rogers

ONE OF THE most uninspiring games ever has just been released by US Gold.

Buck Rogers — who is he, anyway? — has been licensed from Sega and part of the game adapted for the computer. No doubt US Gold has tried to be faithful to the arcade version, but surely the graphics could be more detailed. After all, the original is a couple of years old with graphics of the **Space Invaders** era.

You start by skimming forward across the surface of Planet Zoom. In the first tedious screen electrified portals appear. Just fly through 11 of those and onto section two.

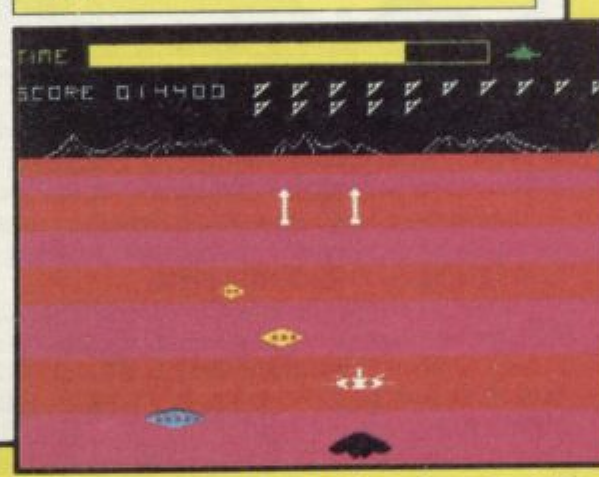
Next fly through the posts and kill off numerous alien saucers and space hoppers. There are five sections in each level, increasing in difficulty. Finally you reach space where assorted aliens and the mother ship must be blasted. At level two, the whole sequence starts again.

Planet Zoom consists of lines of colours receding to the horizon. Those with mono sets may count themselves lucky. In colour a revolting pink and crimson form the lines and in level two, a brilliant blue and red. No doubt level three is as horrible.

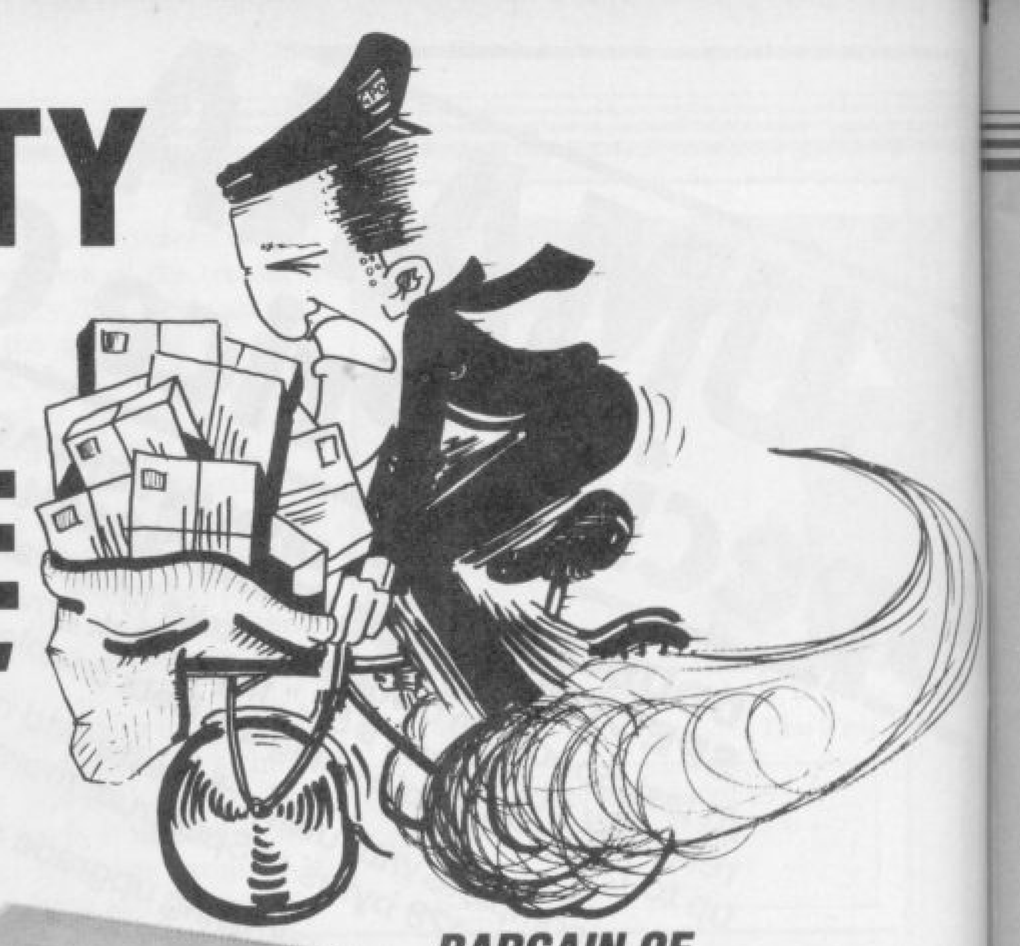
In short, there are better things to spend your money on.

Clare Edgeley

Publisher US Gold **Price** £7.95
Memory 48K **Joystick** Kempston, Sinclair, cursor
★★



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Hyperdrive

AS SOFTWARE houses plough through all the old favourites, English Software, hitherto known mainly for Atari games, has produced the first car racing game for the QL. **Hyperdrive**, looking remarkably like the arcade favourite **Pole Position**, pits you against a large field of drivers in a gruelling four-stage race.

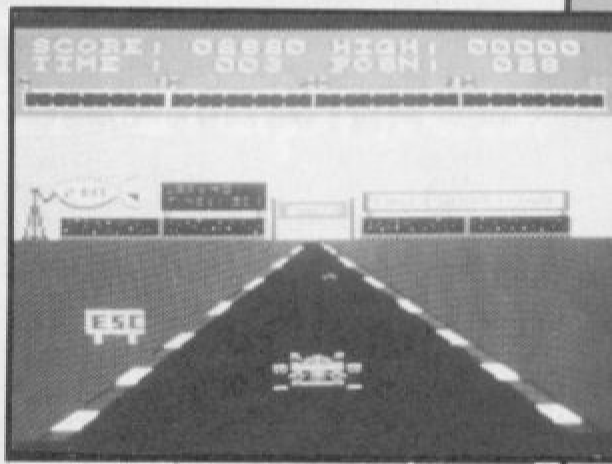
The idea is simple enough. You have 40 seconds to complete each stage, at the end of which you must be in the first five to qualify for the next level. If you crash, you are wonderfully reconstituted in the twinkling of a sprite and put back on the track — at the cost of several race positions.



The cars themselves are very prettily programmed, well up to arcade quality. The customary globular blue oil slicks are hazards to be avoided, and the action is fast. The background scenery is pleasant enough but hardly inspired, and the tracks are either a continuous straight or a continuous curve. That is something of a pity, as the best Spectrum race games take a varied track with hairpins, chicanes and the like for granted.

English software tells us that the code occupies about 75K of RAM, not including the graphics screen. If that is the case then, maybe there wasn't room to vary the tracks. Maybe the programmer should be writing better code.

The sound effects are OK although, inevitably, unpleasant after a few hours' play, and the game itself is a step in the right direction for QL software. Prices still seem to hold more threats than promises, but at least **Hyperdrive** is a competent, if simple, arcade game. The company hopes to release further QL arcade games, and we look forward to the results with some interest.



Chris Bourne

Publisher English Software
Price £14.95
★★★

QL Reversi

ANOTHER stunningly original QL game belly-flops onto the market in the shape of Reversi, that ancient board game which nobody had ever heard of until it was recognised as one of the very few games you could fit into a 1K ZX-80.

Reversi, otherwise known as Othello, is the one where you put white and black pieces in turn on an 8×8 board. A valid move must make a capture, and to capture you must have two of your pieces at each end of a row of your opponent's pieces. Then the enemy men turn into your own colour — hence the name Reversi. Good stuff, eh?

A minute to learn, a lifetime to master, says the blurb. But you're unlikely to spend a lifetime with the game, unfortunately. Softschool's version is pedestrian, with eight levels of skill. The eight levels are produced by knocking a minute off the time limit for completing the game. Don't be fooled by the Analysis mode, either. It doesn't show you what the QL is thinking, as you might expect. Instead it allows you to set up a position on the board.

The computer does not make a particularly good player. Othello is one of those games where machines tend, on the best versions, to be almost impossible to beat. Not so with this version. Written entirely in SuperBasic, it looks like the sort of thing which would be rejected as a magazine listing.

It is quite ridiculous to expect people to pay for a game which they could obtain in listing form from any number of books or magazines at a fraction of the cost. A game, moreover, which was never very exciting at best, and whose interest lies mainly in the opportunity it allowed programmers to experiment with simple artificial intelligence routines.

Quite simply, it's an insult to the QL and the intelligence of those who bought one.

Chris Bourne

Publisher Softschool,
471 Hornsey Road, London N19 3QL
★

Hopper

WHY ARE 90 per cent of QL arcade games like early VIC 20 rubbish? What posesses people in this Great Industry of Ours to attempt to flog the stuff they sometimes do?

We're talking about **Frogger**, folks. That's right, **Frogger**, renamed **Hopper** by Microdeal, presumably misled into believing the name sounded catchier.

Guide the bouncing frog through six lanes of traffic to the river. The fast lanes are fast and the slow lanes are slow. Then you have to cross the river. Jump on the logs and the sinking lilies. Which are lilies and which are logs? The lilies look like logs, except their yellow. The logs don't look much like logs but they're red. That's how you know they're not lilies.

On later levels you get the highly original crocodiles and the breathtakingly novel snakes. They chug along happily, and if you throw a teacloth over the keyboard you can even convince yourself you still own that old Dragon 32.

Please, please, vote with your wallets and avoid this game. You might just save the QL games industry from premature extinction – because if **Hopper** makes money, why should anyone write anything better?

Chris Bourne

Publisher Microdeal **Price** £14.95
Joystick compatible
★

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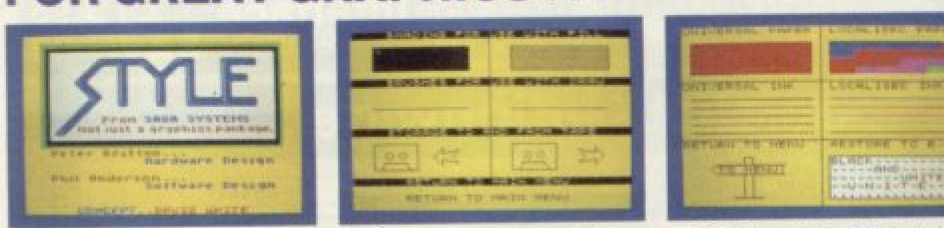
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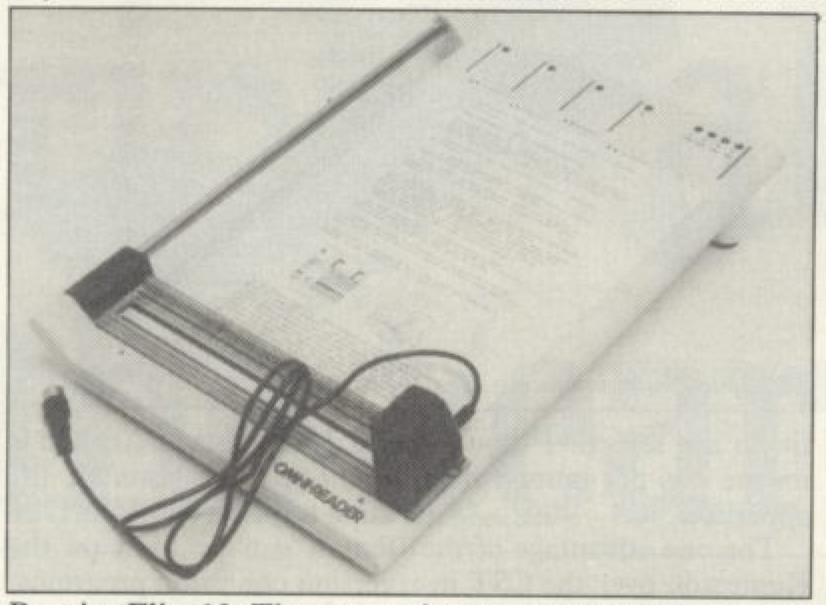
Reading between the lines

THE OMNI-READER from Oberon International is the first OCR — Optical Character Reader — for less than £1,000. Not only does it fit on a desk top but it will work with both the Spectrum — with Interface One — and the QL. For the price you cannot expect it to be all singing and dancing, but, within its design limitations, it is a remarkable piece of hardware. It even won a Sunday Times award for the best innovation of the year.

It consists of a plastic tablet, a little wider and a little taller than a sheet of A4 paper. On one side is a slide which holds a ruler at right angles across the tablet. On the ruler is the read head. The ruler is lined up with a piece of text and the head moved by hand from side to side to read into the computer. A series of LEDs along the top of the tablet are used to show its status.

The Omni-Reader connects to the computer via an RS232 port. On the QL you can use a standard Sinclair lead — supplied by CLPS it is cheaper — plugged into SER2. On the Spectrum some of the wires have to be swopped. It can be set to send information at a number of different baud rates from 300 to 9600.

In order to keep the price at a realistic level a number of limitations have been put on the Omni-Reader. The main one is that in its standard form it can only recognise four different type styles. Courier 10, Courier 12, Letter Gothic 12 and Prestige Elite 12. Those represent 80 percent of the most commonly used type faces in business. It does, however, mean that for the home user you can not use it to enter listings from magazines — which tend to be the wrong size and style — or dot matrix printouts.



To get around that limitation it is possible to download different styles but at the moment, and for the forseeable future, it is unlikely that the facility will be available to Sinclair users'. That is because the Omni-Reader is aimed at the business user and is supplied with software for those machines. As a humble home computer user you have to write your own input routines and, as a matter of policy, Oberon will not tell you how to program your own styles.

Using one of the four type styles you can, with practice, get better than 95 per cent accurate input. Using some sample text supplied with the Omni-Reader I managed to get 100 per cent but that was by being excessively careful — and slow.

Speed is another important consideration. It takes roughly two to three minutes to input a page of A4 text, longer if you have to re-read lines due to errors. That is approximately the same speed as a good copy typst, who would be possibly less prone to errors.

So that, in theory, you do not have to use the keyboard to change type styles or send control codes there are some options printed on the top of the tablet, with more in the manual. If, for example, the text you want to input is only made up of numbers and pound signs you just run the read head over the word Numeric, which is preceded by two special black blobs, on the top of the tablet. That works quite well although reading from the manual requires you to hold both the manual and ruler while moving the read head, all at the same time.

Overall the Omni-Reader is the sort of peripheral which you cannot do without or is completely superfluous. It works well, but you might find it frustrating as you cannot use it on everything. It even has problems reading the QL manual which, although clearly written, uses the wrong type-style. It shows what can be done at a realistic price, but soon makes you want more features.

The basic Omni-Reader is priced at £399.00 plus VAT (£458.85).

Oberon International, 2 Hall Road, Marylands Wood Estate, Hemel Hempstead, Hertfordshire, HP2 7BH. Tel: 0442-3803.

more hardware on page 38

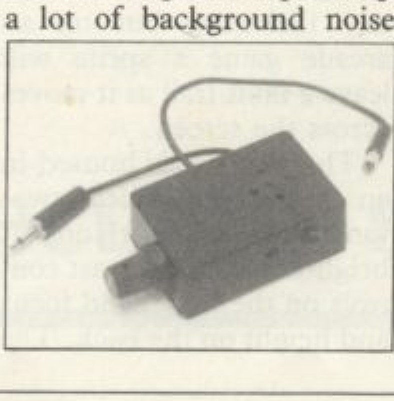
Mouse attacks the ZX BEEPer

THE FEEBLE Beeper is under attack again, this time from the Multitron Megamouse, a combined BEEP amplifier and on/off switch.

The Megamouse takes its power from the Spectrum power supply, and has a lead which then plugs into the back of the Spectrum. Another lead plugs into the EAR socket, to provide the BEEP signal, and there is a socket on the Megamouse to take the lead from the cassette deck.

The volume is controlled by a knob on the side of the box. When first turned on it is at full volume, which can lead to perforated ear drums if you forget to turn it down.

Although it works well as a BEEP amplifier it picks up a lot of background noise



and emits a continuous buzz. A hand placed over the speaker will mask it sufficiently but that makes using the Spectrum rather difficult.

The combined features make the price of £11.99 plus £1.00 p&p reasonable, but the buzz is so annoying that after a while you might unplug it and settle for peace and quiet.

Multitron, 5 Milton Close, Headless Cross, Redditch, Worcestershire, B97 5BQ. Tel: 0527 44785.

QL link for Kempston

KEMPSTON has been holding its fire while the QL market sorts itself out but now the company has jumped in with both feet and released both disc and printer interfaces.

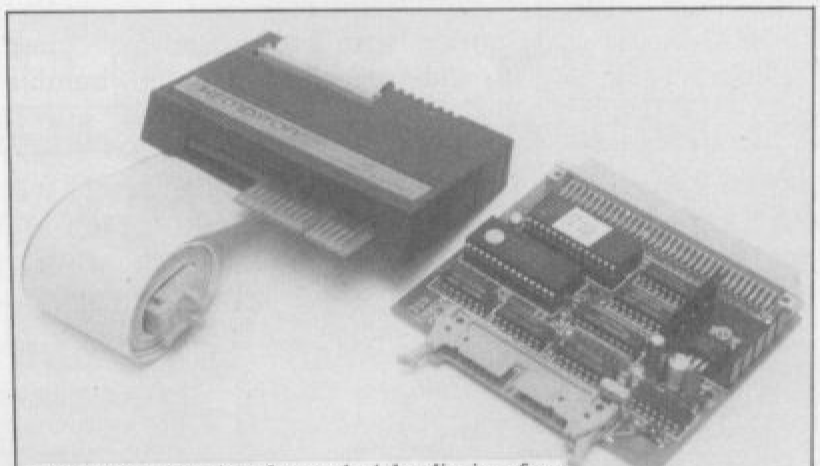
The disc interface is reminiscent of the GST unit in performance and physically similar to the Silicon Express. Now that CST has dropped its price all three are about the same, Kempston's being £115.00 inclusive. With the CST and Kempston being so close in terms of performance — Silicon Express lags far behind — it will be interesting to see which comes out on top.

The interface board is uncased and fits into the port on the left hand end of the QL, with just the drive cable connector sticking out.

Once fitted it responds to the device name FLP, the same as Silicon Express, CST and Technology Research, and you can use discs from those interfaces freely. All the normal microdrive commands can be used, using FLP in place of MDV, and it can access up to four separate drives. As with CST and TR, on power-up it examines the disc for a BOOT program and then looks for a microdrive cartridge, turning off the disc if it does not find one.

The extra built-in commands have to be initialised using FLP_EXT before use.

Once initialised the extra commands can be listed by the command EXTRAS. That only works if you have a drive plugged into the interface. As with CST there are new commands to open files, use wild cards, and use random access on files and control jobs. The only differences are that the Kempston has AJOB and SPJOB to activate, or set, the priority of a job — those have been dropped by CST in its latest release — and CST has PROG_USE and HEX and BIN conversion commands which are missing from the Kempston. VIEW, which is unique to Kempston, lists a file to a stream with each line truncated to fit on the screen. I thought its use was not immediately apparent.



Kempston printer interface and, right, disc interface

The one advantage of the Kempston over the CST interface is the manual. While the CST manual is woefully lacking, not even detailing some of the commands, the Kempston manual is clear and concise.

The printer interface is unusual in many respects. Unlike any other it fits into the ROM slot on the back of the QL and is capable of both normal — text — printing and shaded screen dumps. In addition there is the facility to use part of the QL memory as a printer buffer, with printing being carried out as a multitasking job, only stopping when a drive is accessed.

The printer port is given the device name PAR and is opened to a stream in the same way as a serial port. So that it can be used on the version one Psion programs, or any others which expect you to use the serial port, the command PAR_USE is used, as in PAR_USE SER.

For screen dumps two extra commands have been added. SDUMP sets the channel to which a dump goes and the window to which it dumps, and SDSET determines the type of printer, size and type of shading. Nine different printers are catered for, normal Epson types plus FX80 and JX80, Seikosha GP-100A, GP-250X and GP-700A, Canon PJ1080A, Brother HR5 and Olivetti JP101.

The printer buffer is associated with the port, as opposed to the stream. That useful feature means that you can repeatedly OPEN and CLOSE a stream to the port. Any printing that needs to be done will be put in a queue, being printed when the port is free, rather than waiting for the port to be free before a stream can be opened.

Kempston should do well in the QL market. Its disc interface will give CST a run for its money while the printer interface, priced at £39.95, as the only one offering shaded screen dumps, will find its own niche. The only clouds on the horizon are the Technology Research disc and printer interface, at £129.95 some £25 cheaper but offering fewer features, and the Medic interface when it becomes readily available.

Kempston Micro Electronics Ltd, Unit 30, Singer Way, Woburn Road Industrial Estate, Kempston, Bedfordshire, MF42 7AF. Tel: 0234 856633.

Slow glow and flicker free

THE BENEFITS of adding a monitor to the QL are many but the price tends to put people off. The Ferguson MMO2 is a 12in. green — or amber — screen monitor which is capable of handling the QL's 85 characters and has been advertised at as low as £75.00

The display is clear — it makes a change to be able to actually read all of the 85 characters — and steady. That is achieved by using a slow decay phosphor. When a pixel is lit it will still glow for a fraction of a second after being turned off. When using the Psion suite, where the display tends to be fairly static, that removes any flickering but on an arcade game a sprite will leave a faint trail as it moves across the screen.

The monitor is housed in an attractively-styled two-tone brown case with on/off, brightness and contrast controls on the front, and focus and height on the back. The screen is anti-glare, but the surround clips the corners of the display. As the monitor does not have any means of angling the screen you will have to put it on a stand, or prop up the front.

For the price it is as good as most and better than many. The only problem is trying to get a suitable lead to fit it. As no details are given in the manual you have to go to Ferguson for one.

more hardware on page 40

The Rotronics Wafadrive 'Peripheral of the Year'*

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ROTRONICS



*Computer Trade Association 1984 Product of the Year (Peripheral)

the Spectrum storage system

Quick Disc makes a change



CONSIDERING the price of disc drives, the new Triton Quick Disc from Radofin — anyone remember the Aquarius? — Electronics Ltd looks like a good deal. For only £119.95 you get a disc drive and an interface for the Spectrum. First impressions can be deceptive but, and it is a big but, it does offer disc drive speed at a very reasonable price.

As with other fast storage devices in its price range, the microdrive and wafer drive, it is dedicated to the Spectrum. Therefore, if you decide to change computer you will have to throw it away.

The Spectrum interface is hard wired to the drive using just over 1/2 metre of cable. That is 5cm too short if you want to put the drive on the left of the Spectrum. On the side of the interface is a two position switch to denote first and second drive — the interface for the second drive plugs into the back of the first. The instructions say that only the second drive or a ZX Printer should be plugged into the interface, which is a problem if you want to add a printer or joystick interface.

Unlike all other disc drives the 2.8in does not use concentric tracks but a spiral, as on a record. Despite that it is still quick, although not as fast as a normal drive, with most timings taking just a few seconds. Formatting takes eight seconds, CAT three seconds, saving roughly 10 to 15 seconds and loading well under 10 seconds.

The instructions, which admittedly are provisional, say "... after 3 accessments (?), a few seconds rest is recommended.". Presumably they refer to the drive, not the user, but the instructions suggest that the drive is not up to heavy use.

Each disc can hold 100K, 50K on one side, arranged in 2.5K sectors. The drive is single sided so the discs must be taken out and turned over to reach the other side.

The commands used to access the disc are a re-hash of the microdrive commands. You can SAVE and LOAD Basic, code and data, FORMAT the disc, obtain a CAT, ERASE files or COPY them from one drive to another. They also contain some interesting anomalies.

The command to save is SAVE *d;t; "filename" where 'd' is the drive and 't' is the type of file — Basic, code, data. To load any file you use LOAD *d; "filename."

Despite scouring the manual — and not exactly being a stranger to disc drives — I could not find a way to save a Basic program so that it auto ran.

The one good feature of the drive is that it only uses the printer buffer. That means you can clear down to as low as 24000 and still use the drive. Transferring your programs to disc is, therefore, made easier.

For the price, and the ease of use, it is well worth considering but the commands are basic and not well thought out.

Radofin Electronics (UK) Ltd, Hyde House, The Hyde, London, NW9 6LG.

The joystick connection

NOW that arcade games are appearing for the QL the problem of adding joysticks is rearing its head. Rather than buy a joystick with a special plug the best idea is to buy an adaptor for your old joystick, which you can use on another computer, and an adaptor.

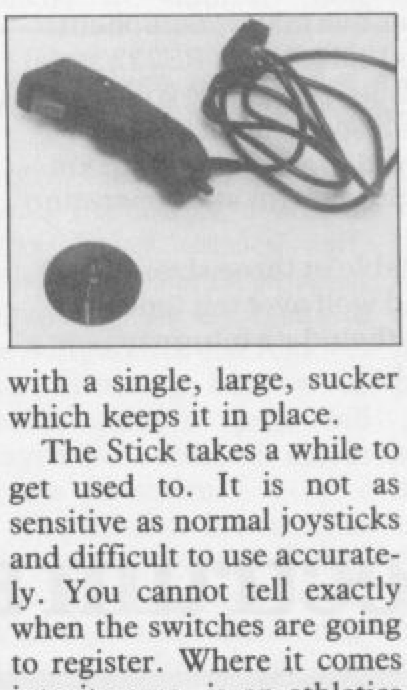
Eidersoft, has produced a suitable adaptor for £5.49, or only £3.49 if purchased at the same time as one of its programs.

Eidersoft, The Office, Hall Farm, Near Ockenden, Upminster, Essex RM14 3QH. Tel: 01-478 1291.



A stick in the hand . . .

MOST JOYSTICKS suffer one major drawback — you need two hands to work them successfully, one to hold the base and the other to move the stick. The little suckers never seem to stick to the desk.



The Stick from Lightwave Leisure could be the answer for those of you who need to use a one-handed joystick so that you can still reach the keyboard without dropping it. It is a joystick handle with four tilt switches inside and all you have to do is tilt the stick to register movement. If you prefer to use it on a desk it is supplied with a single, large, sucker which keeps it in place.

The Stick takes a while to get used to. It is not as sensitive as normal joysticks and difficult to use accurately. You cannot tell exactly when the switches are going to register. Where it comes into its own, is on athletics games, where you need very rapid left and right movement.

The main problem is that the sucker does not keep the stick absolutely upright, so when not in use it still registers. On QL games, for instance, you might find it plays the game all by itself.

Although a good idea the Stick could have been better implemented. At £12.99 it is reasonably priced but you might prefer your tried and trusty sticks a while yet.

Lightwave Leisure Ltd, 2 Maldwyn Road, Liscard, Wirral, Merseyside, L44 1AL. Tel: 051-639-5050.



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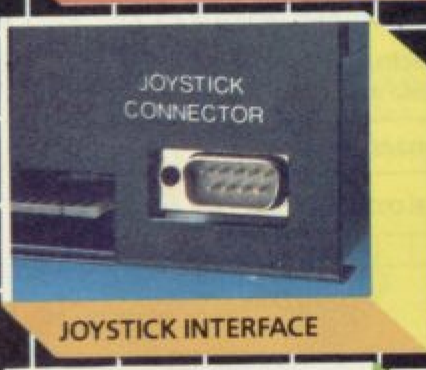
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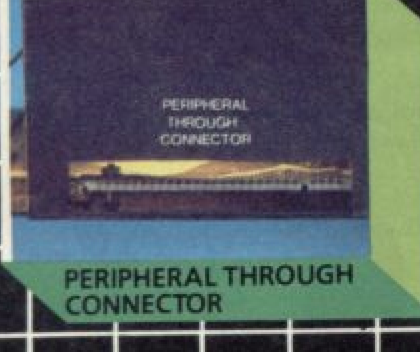
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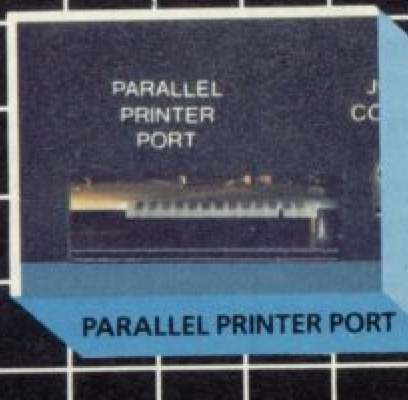
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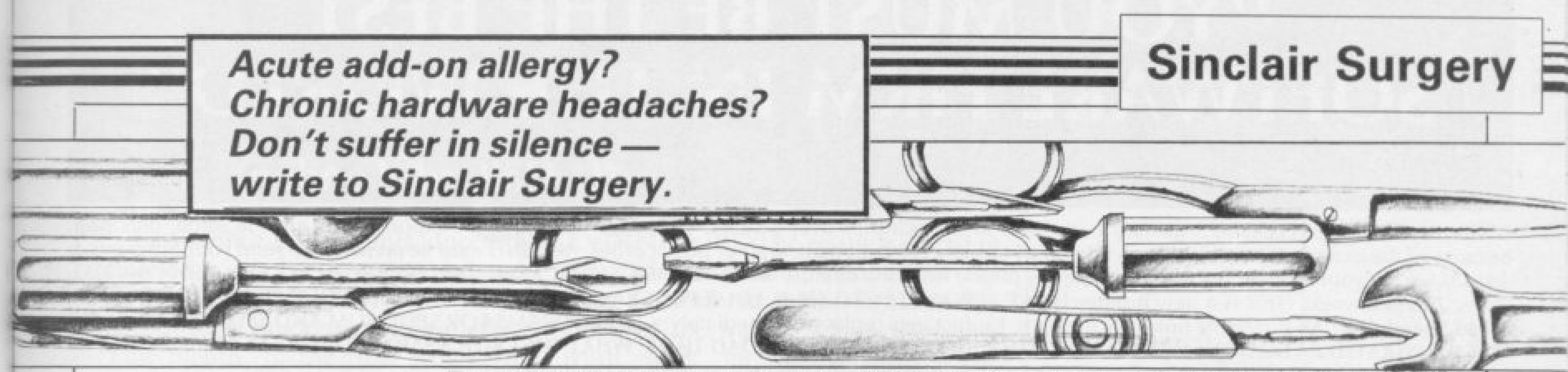
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Wafadrive may cause problem

I HAVE had my Spectrum 48K in for repair four times and the fault still hasn't been cured, although various chips have been replaced.

I am using it with a wafadrive and a Taxan/Kaga printer. After an hour or two it will suddenly crash, especially if I have a long program like **Tasword Two** running. It can crash when no keys are being touched and the printer switched off. Have you any suggestions?

William Smears, Liverpool

● *The problem probably lies with the Wafadrive. Try it out on a friend's machine, if it crashes then it is definitely the Wafadrive, if not it might be the Spectrum. Get the Spectrum's power supply and regulator checked.*

Feedback on double plugs

A FEW months ago I forgot to pull one of the plugs when SAVEing a program and to my surprise found it had been recorded.

I have since been LOADing and SAVEing with both EAR and MIC plugs connected, though the manual says that is not possible. Can I damage my Spectrum by doing this?

C Rout, Hastings, East Sussex

● *The reason you normally have to pull the EAR plug when SAVEing is that the EAR and MIC sockets are connected in the Spectrum. If the tape deck puts out the signal it is receiving, the feed back can damage the deck's amplifier. The signal keeps looping round, getting louder. Even if the deck does not do that the earth loop may pick up unwanted noise.*

A few decks overcome those problems. If it works you are unlikely to cause any damage by not unplugging the lead.

Wanted–Timex software

IS THERE any Spectrum software compatible with the Timex Sinclair 2068? I would be interested in a word processing program, such as Tasword. Would a disc drive designed for Spectrum, or interfaces for Centronics or RS232 printers also work with the T/S 2068?

Vlad Trcka, Ontario, Canada

● *The 2068 is not compatible with the Spectrum in anything other than typed-in Basic programs. Timex (Portugal) is re-releasing it in Portugal with, as far as I know, a plug in ROM which turns it into a Spectrum. Your best bet would be to contact them.*

Crash out of Underwurlde

I HAVE a Spectrum 48K. When I entered one of the caverns in **Underwurlde** my computer looked as if it was going to reset. I pulled out the plug and put it back again but it did not reset.

All that shows now is a lot of coloured lines which remain whether I switch the computer off and on.

Anthony Hetherington, St Ives, Cornwall

● *If you cannot get the copywrite message and just get flashing coloured squares your Spectrum is in urgent need of repair. Send it to one of the specialist repairers as they are more likely to be able to fix it.*

TV twitch on microdrives

ARE MICRODRIVE functions affected by emissions from a TV? I find that all the functions — load, save — fail to complete when the microdrive is in certain positions, but work perfectly when the TV is more remote.

W J Ling, Gerrards Cross, Buckinghamshire

● *Yes, the TV can affect equipment. Ensure the microdrive is away from the TV and that the connectors are clean. If the problem persists, get the TV checked.*

Alphacom and QL printing

I AM thinking of buying a QL and would like to know if the Alphacom 32 printer can be used with it. Sinclair says the printer must be Centronic but cannot tell me if the Alphacom is Centronic.

Dave Wesley, Canterbury

● *The Alphacom 32 will only work with the ZX81 and Spectrum, not the QL. It is not a Centronics printer but dedicated to those machines.*

Kempston E compatibility

I AM experiencing a problem with my Spectrum Plus Interface 1, Kempston E centronics and Texan/Kaga printer.

I have a copy of Masterfile on microdrive. Since I obtained my printer and interface I have had continuous loading problems.

I have written to Campbell Systems who claim that it is my Kempston E causing this hook code error.

Karl Chinnappa, Croydon, Surrey

● *Kempston had a problem with early versions of its E printer interface, which only affected the microdrive version of* **Masterfile**. *Contact Kempston at 32, Singer Way, Woburn Road Industrial Estate, Kempston, Bedfordshire MK42 7AF. Tel: 0234 856633.*

Transfer tape for Beta discs

I HAVE recently bought a Double Density Beta Disc interface and am having difficulty in converting commercial software to my 5.25 inch Cumana disc drive.

Can you tell me who makes an automatic tape to disc transfer program for the interface.

D C Osborne, New Barnet, Hertfordshire

● *Bearing in mind you should only make backup copies of software for your own use, contact LERM, 10, Brunswick Gardens, Corby, Northants NN18 9ER. Tel: 0536 743845. They sell WD1B at £6.99, and TC7 at £15.50 which has details on specific programs.*

Dual purpose QL monitor

I HAVE recently bought a Microvitec monitor for my QL and wonder if my 48K Spectrum can be converted to accept it.

T J Flowers, Rochford, Essex

● *Contact Adapt Electronics, 20, Starling Close, Buckhurst Hill, Essex IG9 5TN. Tel: 01-504 2840. They produce an interface for £34.95 plus £1.00 p&p.*

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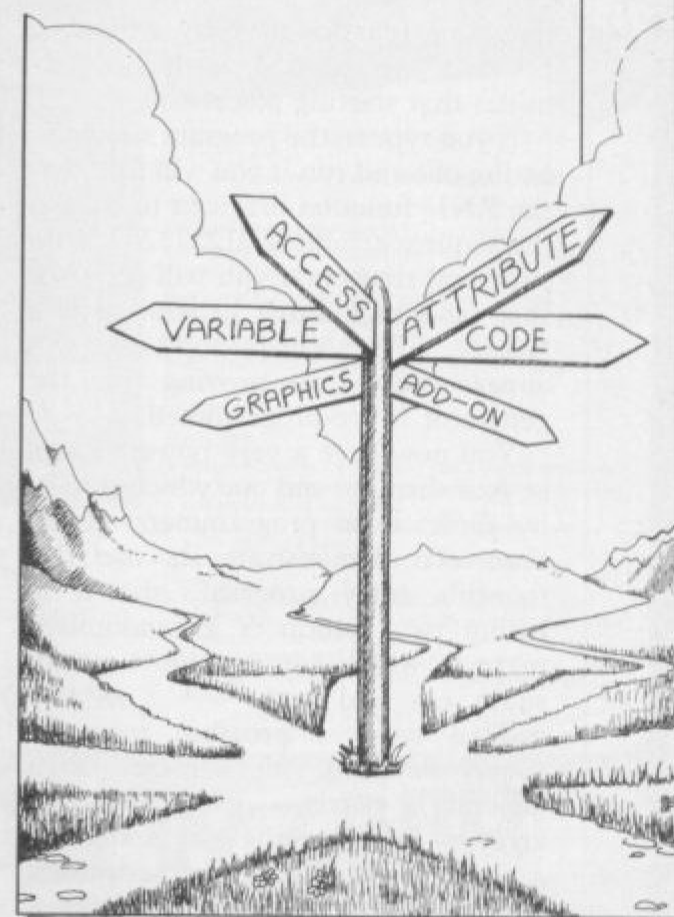
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Alternative generations

In the final part of his series, John Gilbert looks at the number generator and the ways in which it works

RANDOM number generation can be a complex business but the basics are simple enough.

Last month I briefly introduced the RaNDom number function and used it to control the BORDER colour output for a random explosion effect. This month, in the final part of the series, I am taking a closer look at the way in which the generator goes about its work, how you can call it into operation and how to use it as a work horse in complex programs.

First, a shock. The generator does not produce truly random numbers. To be random it would need to pick values out of thin air and, by definition, a computer cannot perform that sort of operation. It needs to be programmed to pick numbers and, for that reason, the generator can only pick pseudo-random values.

The operating system uses a mathematical formula which produces a sequence of values between zero and one. Such a sequence could, for instance, be 0.302167889, 0.322167889, 0.332167889. That list of numbers is useless to anyone interested in producing results. For one thing the numbers are too long. Can you imagine using an IF . . . THEN statement such as

IF A=0.303198267 THEN GOTO 20

to make a simple random decision? The best numbers to handle are integers and, in the above state, the integer part of the random number can only be zero.

We can take a leaf out of the operating system's book and use a formula of our own to turn the values into something more usable.

If you have an understanding of decimal arithmetic you will know that by multiplying a number by a multiple of 10 you can move its decimal point backwards, thus increasing its value. For instance, 0.123★100 would become 12.3 as the point has been moved back two places.

The number of places that the point moves backwards corresponds to the number of zeros at the end of the multiplier. If 10 had been used to multiply 0.123 in the example above, the result would have been 1.23.

So, we have part of our formula. In Basic it can be written as A=(RND★10). The result is stored in the variable A and that part of the formula is stored within brackets because of the way in which the Spectrum does its mathematics. The reason for the brackets becomes clear as we move on to the next part of the formula.

We still have a problem because, although we now have figures on the lefthand side of the decimal point we still have figures on the right which confuse the issue. The number in variable A is still not an integer.

As you saw last month, the solution is simply to use the INT function. It is put into the formula before the opening bracket of the expression

A=INT(RND★10).

The reason for those brackets is now apparent. We want the computer to examine and perform the expression within the brackets before INTeger comes into effect.

```
 5 REM set start of sequence
10 RANDOMIZE 10
20 FOR k=1 TO 10
25 REM take next random number
30 LET a=RND
35 REM multiply by 100
40 LET b=INT (a*100)
50 PRINT a,b
60 NEXT k
```

Listing One

The Spectrum does mathematical calculations in order of operator, such as +,−,★ rather than in sequence from left to right. It gives each type of sign a priority number. High priority operations are done first, the lowest priority executed last. The ★ and / operations have a priority of eight while + and − are only worth six. So the Spectrum would perform all multiply/divide operations before addition or subtraction.

There is an exception to the rule — the brackets. Any calculation enclosed within brackets will be performed first, regardless of priority. So, in the example above, RND★10 would be calculated first.

You may be wondering what would happen if there was more than one pair of brackets within an expression. The answer is simple. The expression containing the highest bracketed priority operation would be done first.

The random number generation formula above will produce a two digit number between zero and 10. If you do not want to include zero within the range then just add the number one onto the end of the formula,

LET A=INT (RND★10)+1

which will produce values within the range of one to 11.

The programmer has little control over the RND sequence using just that one function. It is, however, possible to influence the generator with the keyword function RANDOMIZE.

The RANDOMIZE function, shown as RAND on the keyboard, makes the RND function begin reading at a specific place in its sequence of

continued on page 48

continued from page 47

numbers. It is followed by a number between one and 65535 which determines that starting place.

If you type in the program shown in listing one and run it you will find that the RND function is forced to start at the sequence value 0.012573242. Run it several times and you will soon see that random number generation is a fantasy. The same numbers will appear every time proving that the generator is pre-programmed.

You now have a very powerful tool at your disposal and one which is used by professional programmers all the time. To demonstrate its use this month's entry program, shown in listing two, produces a randomised maze in which you can move north, south, east and west.

That type of program may not sound new but most maze games generate a matrix — using a table or array — of a specific size and fill it randomly with location descriptions. The program in listing two, however, holds only one location at a time within the memory. It is, therefore, possible to create an infinite maze with a large number of randomly generated location descriptions, within only a few kilobytes of code.

Before you can start coding you must decide how many room descriptions you want within your maze. Those descriptions may take up most of the memory and they can be as complex as you please.

Listing one has only four types of description for the maze and those are for empty rooms, fountains, monster locations and treasure. There are two ways in which you can store the location descriptions. The first, as shown in listing two, can be used if you have only a few location types. You can use IF . . . THEN statements such as those between lines 1000 and 1040 to specify the ranges of numbers within which the room types fall. For instance, if the random numbers fall between one and five, players might find themselves in corridors, but if the range was between five and 10 they might find a monster.

The other way in which you can represent situations or locations is to put them within a two dimensional array by reading them in through DATA statements.

Once you have decided which location descriptions you are going to use you can get down to coding, most of which consists of number crunching.

```
   5 REM set co-ordinates at 20
20
  10 LET b=20: LET c=20
  15 REM set random number base
(1-11)
  20 LET a=INT (RND*10)+1
  25 REM accept input
  30 PAUSE 0: LET b$=INKEY$
  32 REM check to see if maze bo
undary, imposed by programmer
  35 IF b$="s" AND b<1 THEN  GO
TO 30
  40 IF b$="e" AND c<1 THEN  GO
TO 30
  45 REM check direction, north
south, east or west
  50 IF b$="n" THEN  GO TO 100
  55 IF b$="e" THEN  GO TO 300
  60 IF b$="s" THEN  GO TO 200
  65 IF b$="w" THEN  GO TO 400
  67 REM if no compass direction
 found go for input again
  70 GO TO 30
  80 REM move north
 100 LET b=b+a
 120 GO TO 1000
 130 REM move south
 200 LET b=b-a
 210 GO TO 1000
 220 REM move east
 300 LET c=c-a
 320 GO TO 1000
 330 REM move west
 400 LET c=c+a
 500 REM short room descriptions
. Can be substituted for longer
descriptions if required
1000 IF b<10 AND b>1 THEN  PRINT
 "Empty room"
1010 IF b<20 AND b>10 THEN  PRIN
T "fountain"
1020 IF b<30 AND b>20 THEN  PRIN
T "monster"
1030 IF b<40 AND b>30 THEN  PRIN
T "Treasure"
1035 REM return to input routine
1040 GO TO 30
```

Listing Two

The first part of listing two sets up a co-ordinate system which starts at a base location of zero, zero. Variable B represents latitude and takes care of locations between north and south. The C variable represents longitude and references locations between east and west on the random map.

A third variable, A, is then brought into play. It is used to store a random number, between one and 11, which will eventually act as the key to the whole routine.

The next section of the listing accepts a one-key input from the keyboard. First, it decides whether the input should be allowed — whether it is a direction key — and if so, which direction is being requested.

Movement is accomplished between lines 100 and 400. Variable A, which contains the number between one and 11, is used as an index which steps the b, c, co-ordinate ranges up or down. In that way it is possible for players to move forward into a new location and then backward into the location from which they have just come. Movement left and right, east and south, is accomplished in just the same way.

So far we have only looked at the way of producing pseudo-random numbers and that was in the way which the computer does it. There is another, more ingenious method which we can use with a little forethought.

First we must look for an alternative system which generates numbers of great length, even if those values have only one digit before the decimal point. To do that we should look at the mathematical functions. For most of us, not initiated into the great depths of mathematical science, the results of functions such as PRINT SIN(1) or PRINT SIN(5) seem random — although we know that they are not. What better way than to use a SINe or COSine to generate our own home brew random numbers?

We are in the same position with SIN numbers as we were when we had raw numeric output from the RaNDom number generator. Most SIN numbers have one digit before the decimal point and nine digits after it. All we have to do is to find a SIN by using an instruction such as

LET A=SIN(1)

and then perform our mathematical magic on it. First we shift the decimal point one or two places to the right, as we did previously with the random numbers. That operation is performed using

(SIN(1)★100)

Next we want to make the converted number into an integer. Of course, the instruction is

INT(SIN(1)★100)

That is it and all you have to do now is put the result into a variable ready for use.

Any number of random values can be generated in that way, you can even use the SINes generated to generate yet more SINes to turn into random numbers. You now have your own, alternative, random number generator.

We have come now to the end of this series. Hopefully it has provided you with more to think about. At most you should be very competent in writing in what can be a tricky language at times. At least you should have a more positive attitude when you approach the tasks of writing your own programs.

If you still have specific problems which I have not covered in this series then let me know. It is just possible that I might be back with a new series — ed willing.

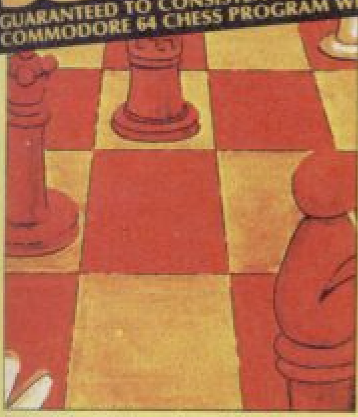
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Getting the best from a bad deal

Another fine mess you've gotten into? Wendie Pearson can help you out

WHEN DELVING into the muddy area of consumers' rights it is best to heed Julie Andrews' words of wisdom: "Let's start at the very beginning. It's a very good place to start."

Mind you, waving huge bags and umbrellas and singing at the top of your voice is unlikely to get you very far when faced with the sharks' teeth bared at you by the World of Retailing.

How to Put Things Right, a leaflet issued by the Office of Fair Trading, tells you how to safeguard your interests in advance. It tells you to keep receipts, stop using faulty goods at once and tell the shop immediately if something is wrong. Jim Spinks, of the Trading Standards Authority at Croydon, says: "The length of time you wait is important and the longer you wait to do something, the more the law says it's your fault. But if you have a problem, it's the retailer who's responsible for putting things right, not the manufacturer — unless it's a manufacturing defect."

Basic to the law is the Sale of Goods

Act, which says that if the goods do not work properly or break down within a few months you are entitled, in most cases, to your money back.

"Most shops want to do a repair or offer you something else, but it's up to you. If it's not as described, for instance, you're entitled to your money back," says Spinks.

The law has three rules. Goods must be of merchantable quality, not broken or damaged. However, if goods are very cheap, secondhand or 'seconds', you cannot expect top quality.

Secondly, goods must be as described, and that applies to descriptions given on the package or by the retailer when you buy. Thirdly, goods must be fit for their particular purpose.

What happens if you buy a cassette recorder which was unable to load software properly but was more suited to playing music? "Awkward one," Spinks says. "If the purchaser went to a specialist computer shop, it would be taken that they had implied use of computer tapes. But if they had bought it at an ordinary department store, generally the purchaser would have difficulty in taking any action because not all tape recorders would be fit for computer programs."

Spinks advises that you should say what you want the recorder for when you buy it — that at least would give you some protection.

All goods are covered by law including those bought in sales, and that applies whether you buy goods from a shop, street market, mail order catalogue or from door-to-door sellers. That means that if you buy computer games from a market trader you do, in effect, have the same rights as if you had bought from a shop. The problem here, of course, is finding the trader if he's upped and gone.

If any of the three rules have been broken, you should be able to get a cash payment to make up the difference between what you paid and the reduced value of the faulty item, or reject it and get your money back. If you both agree, you may get a replacement or a free repair. But remember — under those circumstances you are fully entitled to your money back and should not be talked into any other option unless it is what you want.

What you are entitled to depends on how serious the fault is and how soon you tell the seller. You forfeit your entitlement to anything if you examined the item when you bought it and should have seen the faults, were told about the faults, changed your mind about wanting something, did the damage yourself or got it as a present. In that last instance, the person who bought the gift must make the claim.

If you take a faulty peripheral back to the shop, you should ask for the manager, and keep cool, reasonable and calm. Explain your case. If you have no luck and the staff are rude, or unhelpful and won't let you get a word in edgeways, you should refrain from telling them where to go. Instead, contact the managing director at head office and check to see if the firm belongs to a trade association. If they do, the association may intervene in any dispute.

If you write any letters in connection with your complaint, send them by recorded delivery and keep copies of both your correspondence and theirs. The Office of Fair Trading also advises that you do not send the company any receipts or other proof of purchase, but only photocopies of those or reference numbers.

Whether you complain in person or on the phone, get the name of the person you speak to. If they refuse, which unfortunately some people do these days, get the name of their boss. If they refuse that, too, make a note of that along with anything else that is said or done as you may well need it at a later date. Always keep notes of what is said and done at each stage.

If things start looking rather grim and everyone in sight is giving you a hard time, soldier on and visit the Citizens Advice Bureau — CAB — or local Consumer Advice Centre, both of which are there to help you, and are listed in local phone books. They will take up the matter for you, but at the end of the day you may have to drag the offending trader to the County Court and sue them under the Sale of Goods Act, using the small claims procedure. A booklet called *Small Claims in the County Court* is available from the County Court or your local consumer advisor.

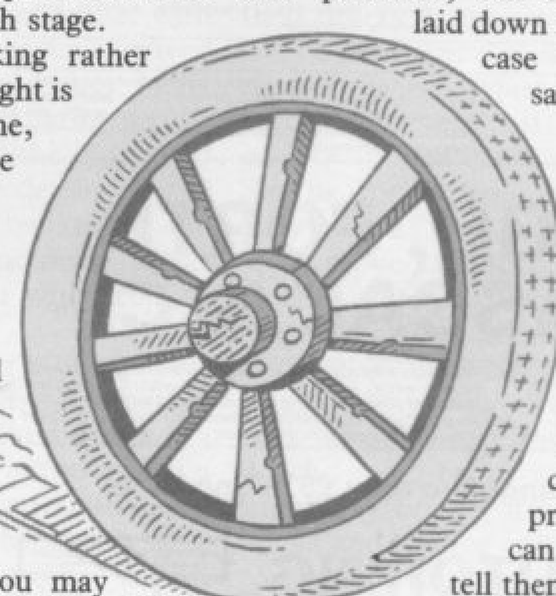
If you decide to go for that, CAB will help you fill in the forms. The fee is about 10 per cent of the value of your claim, with a £500 limit. If your claim is above £500, it means you can no longer use the small claims procedure although you can obviously still sue in the County Court, using legal aid if you can get it — details available from CAB.

By now, you may be wondering what the Trading Standards Authority gets up to. They enforce the Trade Descriptions Act and investigate false or misleading descriptions or prices. For instance, an advert quoting a micro's price at £399.99 is classified as misleading if it does not include VAT. That would only apply to consumer ads such as those found in *Sinclair User*. If a publication has a business readership instead, adding VAT onto advertised prices is not obligatory.

Watch out for retailers who try to lump on additional costs when you buy a computer. You might be told that you need a special interface or peripheral to make something work, which costs extra.

Many users are also unclear on the warranty situation, although readers of last month's *Sinclair User* should be more than clued up by now! Surprisingly, there is no legal warranty on repairs, according to the TSA, although in practice most repairers will provide one lasting about 90 days.

"If there's no guarantee on the goods, you can insist on repair or replacement up to about four months after purchase, but there's nothing laid down in law, as every case is different," says Jim Spinks.



"The rules on warranty are that it must be done in a workmanlike manner and at a reasonable price. If they don't do it properly, you can go back and tell them to do it again — otherwise, you can get it repaired elsewhere and sue them for the expense." If you are unlucky enough not to get your goods back, you can sue for the value of equipment at the time it was sent to them.

If a company has gone bust, Spinks advises that you get onto the list of

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Illustration: Stephen Wright

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creditors kept by the receiver, who is in the local phone book under Official Receiver. Alternatively, try the local consumer advice centre.

With so many hardware and software companies going down over recent months, it is important to know where you stand if you have ordered goods from a company which has cashed your cheque, not sent you the goods, and gone bust. The companies concerned are too numerous to mention, but if you have ordered through a magazine, you should contact the advertising manager first, who can often do a lot to help.

Postal contracts, the kind you enter when you buy through mail order, are known to be a real pain, as you become an unprotected creditor when a company goes into receivership. Long words apart, that means you are the last category of person to get your money back — and even that depends on whether the company has any money left to give you.

Protected creditors are mainly businesses, such as banks or building societies, which will have asked for security before giving loans to a company. They are always paid first, and other businesses to whom a firm owes money tend to get what is left over, followed by Joe Public who often gets only an unwelcome overdraft for his trouble.

Lawyer James Campbell, of London firm Wilde Sapte, says: "Small creditors don't usually get much as there isn't usually a lot left and there's no recourse to the directors, either. There is a law going through parliament which makes the directors liable if they didn't act in a normal, prudent way. The new law will protect against negligence and provide a duty of care to people concerned with the company.

"The man in the street does have recourse in law, but if the company has no money, there's nothing he can do."

So what about companies which go into liquidation, leaving masses of people without goods and without their money back, only to spring up under another name often with the same staff and often selling the same kinds of goods?

The current situation, says Campbell, is that "you can sue one company, but unless you can prove a connection between the two companies, you can't sue successfully. You must prove the directors have taken assets or information into the second company from the first."

That said, anyone who has fallen victim to such a situation may as well hold their breath until October when the new Insolvency Act, should come into force. That, at last, will hold directors responsible — to an extent — for debts incurred by their companies.



"Joe Public often gets only an unwelcome overdraft for his trouble"

The Mail Order Protection Scheme is also there to help you. You are covered by this if you have ordered goods through a publication which is a member of the Newspaper Publishers Association — NPA — or Periodical Publishers Association — PPA.

Caroline Fruin, advice worker with CAB, says: "If goods haven't arrived within 28 days of the money being sent, the client should write to the advertising manager of the individual publication giving full details. If the advertiser has gone bankrupt, the client will be notified and must submit a formal claim together with proof of payment.

"If the advert was in a newspaper, the final claim must be made within three months of the advert appearing or within two months, in the case of a magazine. With a postal contract, a contract is made when the firm accepts your offer — in other words, when they write to confirm the order or when they send the goods to you. Cashing a cheque is acknowledgement of that order."

The Association which covers mainstream publications such as *Sinclair User* is the PPA, and members of this must operate a mail order protection scheme. "We have an undertaking with the Office of Fair Trading which says that PPA members must compensate readers who lose money when they send off in response to a mail order advert," says PPA deputy secretary Gordon Hurst.

This covers people who do not get their goods or their money back if a mail order advertiser goes into liquidation. In comparison, the scheme run by the NPA also covers people who lose out if a company simply ceases to trade. The Department of Fair Trading is considering whether to apply this to the PPA too.

For those confused by the terminology, ceasing to trade and going into liquidation are two different things entirely. Currently, you cannot get your money back via a magazine, unless it is very good hearted, if a company has ceased trading — it must have gone into liquidation.

The message from Hurst is loud and clear. "If a mail advertiser goes into liquidation and you don't get your goods or your money back, then the publisher must pay the reader whatever money the reader has lost," he says.

A publisher at a major London publishing house confirms that a complaint must be sent to a magazine not earlier than one month and not later than two months from when the advert appeared, in order to be considered for compensation when a company goes into liquidation. "But if a company is still trading, we'll still do all we can to get the company to fulfil their orders," he says.

The publisher also says that readers should ask themselves a few questions before they send off for mail order goods. "If you can buy a product in Smiths, for example, at least you can view it first." The word on mail order seems to be caution.

The sort of proof you have to send a magazine when claiming compensation would be a copy of the coupon response — if you have one — photostats of cheques from your bank, which your bank manager should supply, relevant parts of bank statements and cheque stubs.

And now for the good bit! Credit card holders should be delighted to hear that if they pay for their goods using their piece of plastic, and the purchase is £100 or over, they are protected by the credit card company.

Under the Consumer Credit Act, which deals with any credit agreement where money is paid by the customer

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at a later date, the credit card company is liable for sorting out problems of that kind.

A Barclays Bank spokeswoman explains that the £100 rule applies to faulty goods and services as well as to companies which had gone into liquidation. In fact, you can claim even if the company has not gone down. "The customer should send us the claim and we take it over for them, investigating each case on its merits before we reimburse them," she says.

Finally, how long should you wait for mail order goods to arrive? Jim Spinks says: "There is normally a time limit on the order form, but it can take months. If there is no period quoted, you should write to them after 28 days asking them to state when the goods will arrive. If this isn't forthcoming, ask for your money back."

All advertisements are supposed to abide by the British Code of Advertising Practice which requires adverts to be legal, decent, honest and truthful.

The Advertising Standards Authority — ASA — publishes a case report, each month detailing complaints received from the public over advertisements, and Sinclair's name has come up quite a lot, although ASA's spokeswoman Rosemary Goodchild is quick to point out that Sinclair has now sorted out its affairs.

In Case Report 106, dated February 1984, it was stated that five previous complaints had been upheld against Sinclair over the 12 months prior to the report. That report mentioned the case of a £39.95 ZX printer which had been reduced from £59.95. A complaint from four members of the public was upheld in that the reduced price didn't include a transformer included in the old price.

In case report 109 dated May 1984, 20 members of the public had their complaint against Sinclair upheld. That applied to the famous QL delivery saga. The Authority concluded that the initial production targets "were not sufficiently high to warrant the campaign which had been undertaken."

More recently, in case report 121 dated May 1985, the ASA upheld a complaint over the wording of an advert for the Sinclair QL. The advert described its advanced SuperBasic language as "the most powerful Basic ever devised." Other forms of Basic were considered more powerful than SuperBasic in certain respects.

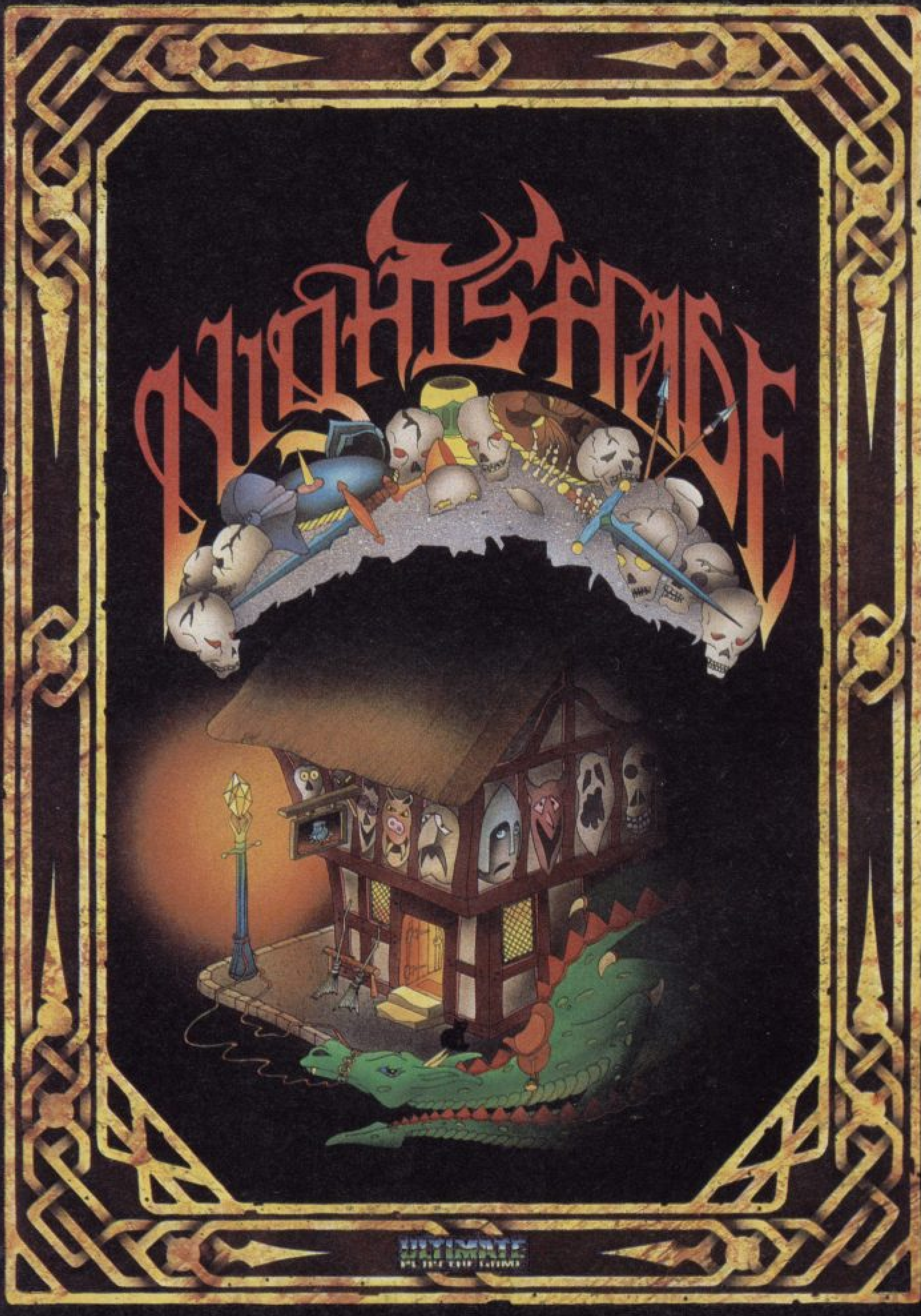
Last of all, don't bother approaching the Consumer Association if you have a problem, as they will tell you in no uncertain terms that you have got the wrong place. In fact unless you're a real masochist keep as far away as possible.

Despite the fact that the Association publishes the excellent magazine *Which?*, two separate spokeswomen, who both refuse to give their names, say they have never even heard of the Consumer Credit Act.

One says: "We don't answer questions from the public. People pay to join us. I'm not a lawyer, I can't give you any details and if people want advice they should contact the Citizens Advice Bureau."

A full copy of the British Code of Advertising Practice is available from the ASA at £1.80 including postage and packing and is also available from libraries, Citizens Bureaux and so on. The code does not apply to broadcast commercials, though, as television and radio advertisers are subject to a separate, closely related code administered by the Independent Broadcasting Authority.

48K SINCLAIR ZX SPECTRUM



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GYRANT

Gyron was not just a load of spheres. Chris Bourne visits the elite programmers who raise software to a classic art form

QUESTION: Who takes over a year to write a hit game these days? Answer: Torus does.

Torus is one of those creative teams, like Denton Designs, which writes programs for other companies, either on spec or according to commission. The advantage is security — you don't get involved with advertising rates and all the overheads of a marketing operation. The disadvantage is you don't see anything like as much loot if your game hits big.

The game which took more than a year was **Gyron**, a *Sinclair User Classic*, and one of the most original and baffling productions of 1985. You have to travel through the mazes of the Atrium and Necropolis, avoiding huge blue balls that roll along the corridors. Towers overhang your progress, and impede it — shoot them and they turn, producing new complex patterns in the maze, and affecting your strategy for success.

The programming is extraordinarily fine — too good, if anything, as you don't necessarily appreciate it all when you play. This is the tale of Ricardo and his gigantic rolling balls.

Ricardo Pinto and Dominic Prior began it together. They were both mathematicians with degrees from Dundee and Oxford respectively. Ricardo is also something of an artist. The Torus office has his pen and ink drawings on the wall, a heady cross between Japanese art and the sensual, obscene caricatures of Aubrey Beardsley. Ricardo sees games as a potential art form. Dominic, he says "is fixated on the equipment."

What seems to have spurred Ricardo and Dominic to the first steps was simple hatred of the games they saw on the market. Ricardo is particularly venomous about Ultimate and Imagine. "We saw **Pssst**, and **Ah Diddums**. I said, that is absolute rubbish, I can do better." In London they met the shadowy figure of John Dixon. Dixon wanted to make money.

Dixon was a 50-year-old semi-American of distinct bohemian tastes, who claimed to have managed various pop groups in the past. He reckoned he could take Ricardo and Dominic to the top in software.

"We started working in January of last year," says Ricardo, "in a flat in Chelsea. Lots of things we asked the machine to do were ridiculous. 'Why can't we do this?' I cried, shouting and stamping my foot in a tantrum." Theatrical lad, our Ricardo.

The group expanded to include two other programmers, Philip Machan, the games freak, and Mark Whigton. Philip studies computer design at Edinburgh University, and Mark studies artificial intelligence.

"Complicated abstract networks and rotating objects," is what Dominic says was the concept behind **Gyron.** "The potential for graphics on the Spectrum is amazing."

If you rewrite the ROM, that is. Torus did. The ROM draw routine in the Spectrum is ten times slower than that used in **Gyron.** "We are totally disgusted by sprites," says Ricardo. "The balls in the trenches range from two pixels to 512 in diameter. There's no way you could do that with sprites. We modelled a 3D world and then created two windows onto it. There are billions of possible views, even without the spheres."

Once they're off on the glories of their programming there's no stopping them. Oddly enough, they don't sound immodest about it. They speak with such impatient joy in the elegance of programming that it's more like listening to a charismatic preacher than a self-important bore.



The balls in their court: Dominic, Ricardo, Mark and Phil.

"There are eight different line draw routines," says Dominic. Ricardo clarifies. "We removed as much superfluous coding as we could. The Spectrum draws a circle in 1040 milliseconds. We do it in 14. A solid sphere takes 20 milliseconds."

It appears that Sinclair Research uses SIN and COS functions to work out the circle. Impressive? Not on your life. "Our circles are rounder than theirs," says Ricardo, proudly. "You *never* use Trig. Our most complicated function is a division. There is a division somewhere, isn't there,



Dominic?"

As if speeding up the drawing routines wasn't enough, the **Gyron** team decided they needed a spare screen. One wasn't enough. "Using a spare screen takes only 23 milliseconds to redraw the frame," says Dominic, who thinks in such units.

What you see, therefore, are intermittent frames, one from the normal display file and the other from an alternative display. The objects might be on one frame and the maze on another. That enables Torus to use more than two colours on the screen without getting the attributes in a mess.

The spheres are drawn using the machine stack, thus disabling all interrupts. Interrupt two is used for the icosahedron, which spins impressively in the corner. Don't ask me how. Ricardo says it's a fossil from an earlier age, and Dominic reckons it's all to do with block dumps.

That was all done with a few Spectrums and televisions and tape decks. "With batteries," says Ricardo. "We spent whole days getting the tape decks to work. John was continually hassling us. We were really enjoying it but it was very hard work. It took three months to write the program to do the spheres."

Originally the game was to be set in a straight trench, but then the lads had the idea of getting it to turn round corners. Ricardo wasn't too keen on the idea of a standard trench game with trap doors and monsters. The spheres were Ricardo's idea of an impervious chunk of wall which moved around. He wanted a game with balls. "All this time John kept coming along and sabotaging our thoughts. I was hysterically keen on the balls. I came in one morning to find John had persuaded everybody otherwise."

The towers took a long time coming. Originally they dangled from the walls of the maze and shot at you.

Eventually the towers became blocks in the maze which could be turned. They affect each other, and the system becomes 'closed' as Ricardo puts it. In spite of all the industrious programming, the maze was only finally designed in January of this year and the towers were not even certain then. Some months earlier Mark and Phil had joined.

"Phil was manic. It was good for us," says Ricardo. "We tended to be too aesthetic and esoteric."

By now Dixon was hot on the track of a deal, but his protégés were becoming increasingly disenchanted with their fairy godfather. "Thorn EMI offered us a derisory deal," says Ricardo. "We went to Firebird and showed it to Tony Rainbird who loved it."

Finally, and fortunately, the deal was struck. "Twelve months to write the game and another two of litigation to get rid of John," says Ricardo. "We haven't made any money out of it. We work incredibly hard and we're very thorough and conscientious and all that sort of rubbish . . ."

The project currently occupying the fevered brains of Torus is the long-awaited Spectrum conversion of **Elite**, the best-selling BBC space game. It's a massive space trading game, with wireframe graphics and shoot-em-up sequences, docking manoeuvres and the like. It bears a superficial resemblance to Melbourne House's **Starion**, via the graphics, but its obvious ancestor is the science fiction answer to *Dungeons and Dragons*, the role-playing game *Traveller*.

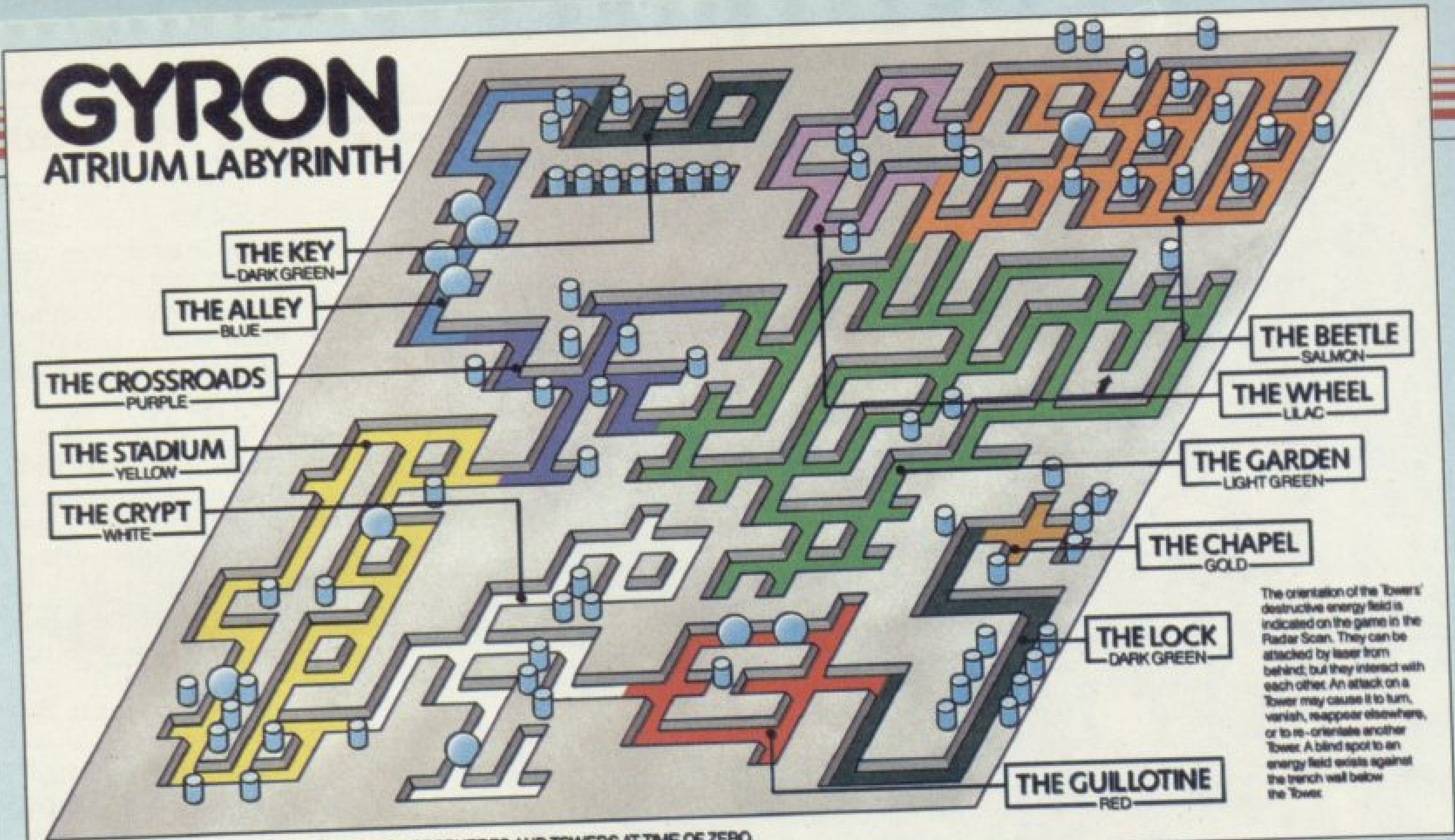
Firebird bought the rights, against stiff competition, for Commodore and Spectrum versions, and the game should be released in September.

"Originally we decided to take it on for the money," says Ricardo. "It's an interesting experience," says Phil, finally getting in on the act as Ricardo pauses to wonder what has changed about his motives for doing the job. "We'd prefer to be doing our own design," he says, eventually. "But in spite of that we're doing the best job we can on **Elite.** We want to make the previous one look silly."

"There's plenty of room to do that," says Phil, ironically.

Later, Ricardo is more enthusiastic. "We've put a lot of careful thought

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MAZE SHOWS POSITION OF SPHERES AND TOWERS AT TIME OF ZERO.

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into it," he says. "I suppose we'd always want to do our own designs, but we have made a few little improvements to it. It will be much better than the Commodore version, anyway, with smoother graphics. As good, if not better, than the original BBC game."

Ricardo and Phil's hesitancy is because **Elite** wasn't their concept, and they themselves are not generally impressed by games based on earlier concepts. Their own ideas hover somewhere in the stratosphere of raw imagination.

Dominic finally hustles the interview towards a Spectrum as the conversation turns to the future. He has been twitching to get at it all afternoon. "Look," he says, showing a screen from **Gyron**, "that's what you get by pointing your camera out of the front end of a car." It's a standard, 3-D perspective image. "We'd like to do different things, *Alice through the Looking Glass* type things."

"Graphics through a fish-eye lens," interjects Ricardo. "**Gyron** is rather like a sculpture, a mobile thing. What annoys us is the market does not seem to have responded to it. British Telecom — who own Firebird — tell us it's the time of the year."

It is difficult to get into **Gyron**, for sure — it takes a good hour of play before the game begins to open up. "It was geared to an older audience," says Ricardo. "Not 6-11 year olds. The Necropolis is too difficult, some play-testers were not able to play it all."

And it is complex, there's no doubt about it. The routes the balls take are predetermined, but at six frames a second it would take 15 billion years to work through all the possible permutations. "You could measure the history of the universe with it," says Ricardo, dreamily. "You could use it as a tool for divination. All sorts of ridiculous ideas . . ."

What if people don't want games

'We didn't write Gyron to make money. It was a very sincere thing'

which measure the history of the universe? What if they just want to fall off Clumsy Colin's **Action Bike** all day long?

"We should cultivate them," says Dominic. "Get the public to appreciate a decent game." They all look — or is it paranoia — as if they expect *Sinclair User* to do something about it.

"We didn't write **Gyron** to make money," says Ricardo. "It was a very sincere thing." He laughs, sincerely. "It's not like distributors saying 'we want three green things bouncing around the screen'. When we see that sort of game we reach for the paper sick bags."

They really want to believe in the future of computer-art-game-theory. You can see them psyching each other up to it.

"As more people come along who are not sprite cowboys . . . you'll get people who found writing books wasn't good enough, who found writing music wasn't good enough. Opera is supposed to be the ultimate in art — drama and music together. With computers, instead of sitting there with 2000 people watching a woman screaming, you could actually do things. You could be the king for real.

"There is *no way* this is going to stay the province of 12 year olds."

Are there no games that win the approval of Torus? Nothing at all?

"**3D Ant Attack**," says Phil. "We thought that was amazing. After that nothing happened. **Jet Set Willy**? **TLL** was hysterical. I suppose **Shadowfire** is interesting."

"Most games are loathsome," says Ricardo. "**Jet Set Willy** was amusing, but there's nothing much I can think of. **Elite** is quite impressive — we have heard people say there's no point in buying **Elite** because of other games around. We've looked at other programs, and found their claims quite stupid."

It all boils down to originality and imagination. "That's why **Starion** is junk and **Elite** is bearable."

You know, if Ricardo and Dominic and Phil and Mark do succeed in transforming games into grand opera, and take us all to the stars, they will be on a level with the guy who invented chess. And if they fail, we will snigger, and say, 'what a bunch of prats.' That's the way it goes with genius.

They all live in Edinburgh now, in much quieter and prettier surroundings to that flat in Chelsea. Whatever you think of their theories, keep an eye out for their next game. And polish up your singing voice . . .

Accumulating logic in the heart of the machine

Marcus Jeffery introduces more marvels of machine code programming

ONE SET of extremely useful instructions in Z80 machine code is known as 'logic' instructions. Those are similar to the logic instructions available in Basic, such as AND and OR.

We will look at those, and then develop a set of picture routines which will allow you to hold more than one screen in memory, copy from one to another, exchange them and merge them together.

When writing programs using Basic, most people have used instructions such as

IF key = "Z" OR key = "X" THEN . . .

in their programs. If you have read the section in the User Manual, then you'll also know that all those instructions return TRUE and FALSE values, where

TRUE = 1
and FALSE = 0

That means that if we write the following code:

```
LET a = 1
LET b = 0
PRINT a AND b
PRINT a OR b
PRINT NOT a
```

it will print '0', '1' and '0'. Also, typing

```
PRINT a>b
PRINT b>a
```

will print '1' and '0', because 'a is greater than b' is true, but not vice versa. In fact, you'll find that any non-zero value is true. Try changing the value of 'a' to a different number in the above code. You may be surprised by some of the results, but if you try something like

IF 15 THEN PRINT "The number 15 can also represent TRUE" you will see what we mean.

What is the point of all this? Well, try

PRINT 99 AND 77

on the Spectrum, and you will get the answer 99. On most computers such as the BBC micro and Commodore 64 — that would give the result 65! The computer came up with that unexpected result by testing the individual bits of the numbers, with each bit representing its own true/false value.

We can see that better by considering the logic in binary:

```
      1100011 (99)
AND   1001101 (77)
      -------
gives 1000001 (65)
```

Even on the Spectrum, when you're working in Z80 machine code. ANDs and ORs work in the same way. So if we had the assembly code

LD A,15 (00001111 in binary)
OR 60 (00111100)

then the value remaining in the accumulator would be 63 (binary 00111111). If we then had

AND 170 (10101010)

we would end up with 42 (101010) in the accumulator — I wonder if that is the way Deep Thought found the ultimate answer in the *Hitchhiker's Guide to the Galaxy!*

The AND and OR instructions always return a result in the accumulator, so there is no need to specify that in the assembly language instruction. All those instructions are shown in figure one. For each bit in the two bytes which are being logically ANDed or ORed, the following apply:

bit 1	bit 2	b1 AND b2
0	0	0
0	1	0
1	0	0
1	1	1

Figure 2.

```
                        ORG     60000
                        LOAD    60000

EA60 210040    MERGE    LD      HL,16384        ;HL = Start of screen
EA63 ED5BB05C           LD      DE,(23728)      ;DE = Memory screen
EA67 010018             LD      BC,6144         ;BC = No. bytes in screen
EA6A 1A        MNEXT    LD      A,(DE)          ;A = Memory Byte
EA6B B6                 OR      (HL)            ;Combine with screen byte
EA6C 77                 LD      (HL),A
EA6D 23                 INC     HL              ;Move to next byte in
EA6E 13                 INC     DE              ;    both screens
EA6F 0B                 DEC     BC
EA70 78                 LD      A,B
EA71 B1                 OR      C
EA72 20F6               JR      NZ,MNEXT        ;Repeat for complete screen
EA74 C9                 RET

EA75 210040    COPY1    LD      HL,16384        ;HL = Start of screen
EA78 ED5BB05C           LD      DE,(23728)      ;DE = Memory screen
EA7C 010018             LD      BC,6144         ;BC = No. bytes in screen
EA7F EDB0               LDIR                    ;Perform copy (HL) to (DE)
EA81 C9                 RET

EA82 2AB05C    COPY2    LD      HL,(23728)      ;HL = Memory screen
EA85 110040             LD      DE,16384        ;DE = Start of screen
EA88 010018             LD      BC,6144         ;BC = No. bytes in screen
EA8B EDB0               LDIR                    ;Perform copy (HL) to (DE)
EA8D C9                 RET

EA8E 210040    EXCH     LD      HL,16384        ;HL = Start of screen
EA91 ED5BB05C           LD      DE,(23728)      ;DE = Memory screen
EA95 010018             LD      BC,6144         ;BC = No. bytes in screen
EA98 1A        EBYTE    LD      A,(DE)          ;A = Memory byte
EA99 08                 EX      AF,AF           ;Save A
EA9A 7E                 LD      A,(HL)          ;A = Screen byte
EA9B 12                 LD      (DE),A          ;Copy into Memory screen
EA9C 08                 EX      AF,AF           ;Now restore A, and copy
EA9D 77                 LD      (HL),A          ;   to real screen
EA9E 23                 INC     HL
EA9F 13                 INC     DE
EAA0 0B                 DEC     BC
EAA1 78                 LD      A,B
EAA2 B1                 OR      C
EAA3 20F3               JR      NZ,EBYTE        ;Loop for complete screen
EAA5 C9                 RET

                        END

Workarea - A50C to A66D
ORG  end - EAA6
LOAD end - EAA6
```

bit 1	bit 2	b1 OR b2
0	0	0
0	1	1
1	0	1
1	1	1

There is another instruction available in Z80. That is an exclusive-or instruction, and is represented by XOR. this can be thought of as 'if bit one is true or bit two is true, but not both'. The logic table is as follows:

bit 1	bit 2	b1 XOR b2
0	0	0
0	1	1
1	0	1
1	1	0

One special use of the XOR instruction which you may come across is

XOR A

What's the use of exclusive-ORing the A register with itself? Let us say the accumulator contained the value 19 (00010011 in binary). If we execute the instruction 'XOR A', the following operation is executed:

```
      00010011
XOR   00010011
      --------
gives 00000000
      --------
```

In other words, it clears the accumulator, whatever it contains.

That might, for instance, be used before some addition or subtraction instructions. You could, of course, use the instruction 'LD A,0', but that requires an extra byte and takes seven clock cycles rather than four for the XOR instruction.

Finally, the NOT operation is known in machine code as CPL which stands for 'complement'. That reverses all the bits in the accumulator, so '1's become '0' and vice versa.

Now to the picture routines. There are four routines, altogether, and you could easily add your own. They all operate on a principle which uses an area of memory as though it were screen memory. Though we cannot see that area of memory, as we do with the real screen, we can still put it to all sorts of uses.

The assembly code is given in figure two, with the Basic loader and application code in figure three. Before typing them in, let us look at one or two ways in which the logic instructions have been used.

The first routine, MERGE — use RANDOMIZE USR 60000 — will combine the present screen picture with another presently in memory. Each screen pixel is either lit or unlit, which is a '1' or '0' respectively in screen memory. So, to combine them, we just need to OR all the bits. Doing that for a couple of diagonal lines in one character is shown in figure four. The logic instruction that does this is

OR (HL)

which ORs the accumulator — containing a byte from the additional screen in memory — with the corresponding byte from the real, visible screen.

You might like to try changing that instruction to 'XOR (HL)'; change

continued on page 64

Figure 1 New Z80 instruction codes

AND byte	— AND the contents of the A register with the byte value.
AND reg	— AND the contents of the specified register with the accumulator.
AND (HL)	— AND the contents of the memory location addressed by the HL register pair with the accumulator.
OR byte	— OR the contents of the A register with the byte value.
OR reg	— OR the contents of the specified register with the accumulator.
OR (HL)	— OR the contents of the memory location addressed by the HL register pair with the accumulator.
XOR byte	— Exclusive — OR the contents of the A register with the specified byte.
XOR reg	— Exclusive — OR the contents of the specified register with the accumulator.
XOR (HL)	— Exclusive — OR the contents of the memory location addressed by the HL register pair with the accumulator.
CPL	— Complement the accumulator.

Figure 3.

```
  10 CLEAR 53849
  20 POKE 23728.90: POKE 23729.2
10
  30 GO SUB 1000
  40 CLS : PRINT AT 7.9:"Let's
call this"
  50 PRINT AT 8.9:"<<<SCREEN ONE
>>>"
  60 PAUSE 100
  70 RANDOMIZE USR 60021
  80 CLS : PRINT AT 7.11:"This i
s then"
  90 PRINT AT 8.9:"<<<SCREEN TWO
>>>"
 100 PAUSE 100
 110 RANDOMIZE USR 60046: PAUSE
20
 120 IF INKEY$="" THEN GO TO 11 0
 130 RANDOMIZE USR 60000
 140 PRINT AT 13.4:"Now we've go
t both at once!"
 150 STOP
1000 REM HEX LOAD ROUTINE
1010 DEF FN p(x)=CODE h$(x)-48-7
*(CODE h$(x)>=65)
1020 LET byte=0
1030 RESTORE 2000
1040 READ start
1050 READ h$
1060 IF h$="*" THEN  GO TO 1160
1070 IF LEN h$<>2*INT (LEN h$/2)
 THEN  PRINT "Odd number of hex
digits in: ";h$: STOP
1080 FOR i=1 TO LEN h$
1090 IF NOT ((h$(i)>="0" AND h$(
i)<="9") OR (h$(i)>="A" AND h$(i
)<="F")) THEN  PRINT  "Illegal h
ex digit: ";h$(i): STOP
1100 NEXT i
1110 FOR i=1 TO LEN h$ STEP 2
1120 POKE start+byte.16*FN p(i)+
FN p(i+1)
1130 LET byte=byte+1
1140 NEXT i
1150 GO TO 1050
1160 PRINT "Code entered"
1170 PAUSE 150
1180 RETURN
2000 DATA 60000."210040"
2010 DATA "ED5BB05C"."010018"
2020 DATA "1A"."B6"."77"."23"
2030 DATA "13"."0B"."78"."B1"
2040 DATA "20F6"."C9"
2050 DATA "210040"."ED5BB05C"
2060 DATA "010018"."EDB0"."C9"
2070 DATA "2AB05C"."110040"
2080 DATA "010018"."EDB0"."C9"
2090 DATA "210040"."ED5BB05C"
2100 DATA "010018"."1A"."08"
2110 DATA "7E"."12"."08"."77"
2120 DATA "23"."13"."0B"."78"
2130 DATA "B1"."20F3"."C9"."*"
```

Figure 4.

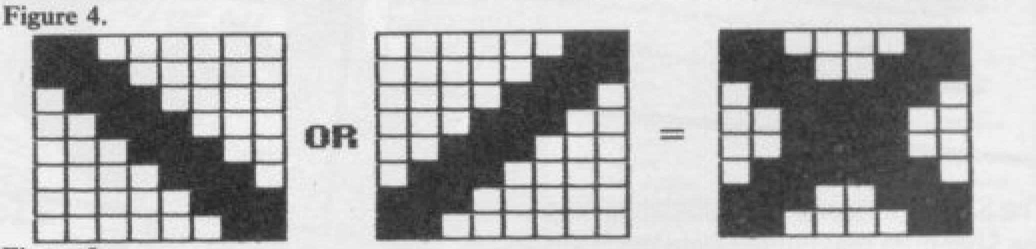


Figure 5.

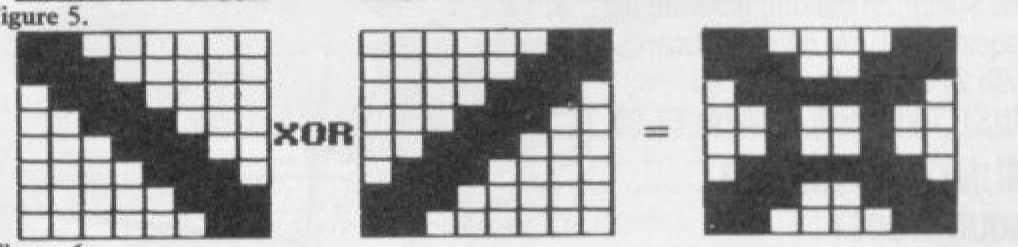
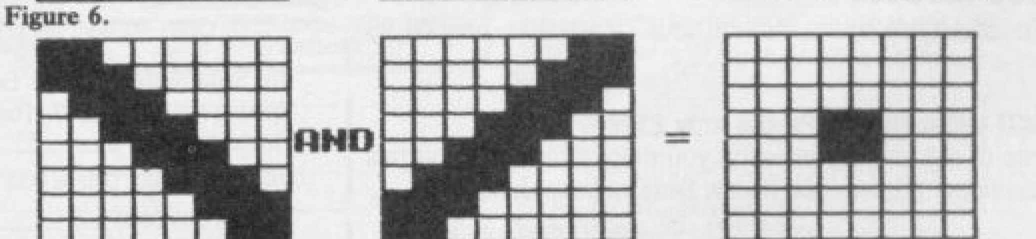


Figure 6.



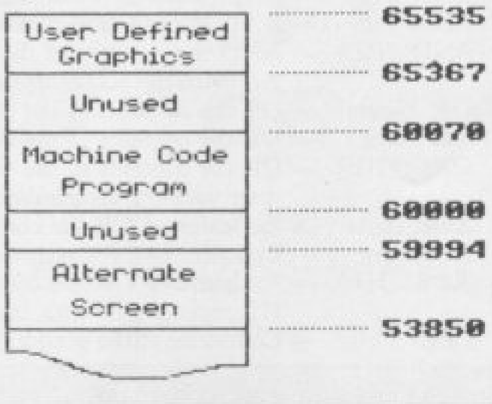
continued from page 63

"B6" to "AE" in line 2020 of the Basic loader to get more unusual effects, as shown in figure five. You could also change it to 'AND (HL)' "B6" to "A6", as in figure six.

The other way we have used logic in this routine is the OR C which is used to check for the end of the loop. We are effectively counting down the BC register pair until it reaches zero. Unfortunately, we cannot check a register pair. What we are really doing is jumping to MNEXT if either of B or C is not zero. That could be done by checking B, and jumping if not zero (JR NZ), then checking C and jumping if not zero. However, we can get the same effect by ORing the register values and jumping. That is a fairly standard and accepted method of completing loops where the loop counter exceeds one byte, that is, 255.

We have used the same looping technique in EXCH — use RANDOMIZE USR 60046 — which will exchange the picture in memory with the real screen. Do not worry about the meaning of the 'EX AF, AF' instructions. They are only used to save and restore the accumulator, and you could just as easily use 'PUSH AF', for the first , and 'POP AF', for the second, but the instruction used works faster.

Figure 7.



The other two routines are COPY1 (RANDOMIZE USR 60021) which will copy the visible screen to memory, and COPY2 (RANDOMIZE USR 60034) which does the opposite. The LDIR instruction effectively replaces the series of instructions:

```
LOOP  LD   A, (HL)
      LD   (DE), A
      INC  HL
      INC  DE
      LD   A,B
      OR   C
      JR   NZ,LOOP
```

— a very useful instruction which we will be considering at a future date.

To use the routines, you have to initially CLEAR room for the invisible screen. In the Basic example, that screen has been placed in the 6144 bytes from location 53850. That is the reason for the CLEAR 53849 instruction. To specify that this is the screen for the routines to use, the first screen location has to be POKEd into the two locations 23728 and 23729. Those are two unused locations in the area used for Spectrum system variables — see pages 127-130 of the *Spectrum User Guide*. Those locations are very useful, keeping the screen location safely out of the way of any machine code application programs.

The numbers which should be poked into these locations are

POKE 23728, screen — 256 * INT (screen / 256)

and POKE 23729, screen / 256

The way the memory has been used in the example program is shown in figure seven. Of course, there's no reason why, by changing the values in locations 23728 and 23729, you should not hold a number of hidden screens, using the routines to carry out operations on all of them.



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QSpell

QL QUILL has always been a favourite word processor of mine. However, without mailmerge and spelling checker facilities it falls behind programs like **Wordstar** for business use.

Eidersoft has started to fill this void with the release of **QSpell.** In addition to checking spellings **QSpell** can be use to help solve crosswords.

Before it can be used a copy and a specially adapted version of **Quill** must be made. Creating the copy, including formatting once, takes about 11 minutes and adding the multitasking routine to **Quill** about a minute. Fortunately, that is done just the once. The routine makes **Quill** reminiscent of earlier versions, constantly accessing the microdrives. It is best to have two copies of **Quill,** a **QSpell** version for editing checked text and a working copy for writing the text initially.

The copy of **QSpell** is placed in drive 1 while the master is used as a key in drive 2. Once loaded, the main menu offers the options of proof reading to the screen or printer, proof reading to an edit file, accessing the dictionary, editing the dictionary, loading or saving the dictionary and exiting **QSpell.**

The proof reading options allow a **Quill** file to be read into **QSpell** from either microdrive or disc, and checked for mis-spelt words — that is, words not in the **QSpell** dictionary. The output can be to the screen — misspellings are highlighted in red — to the printer — highlighted in bold — or to a file which can be loaded into the adapted Quill for editing.

Further options allow the file to be checked without supervision — misspellings are highlighted automatically — and with supervision — you are given the choice of adding unknown words to the dictionary, marking or ignoring them.

The **QSpell** adaption of **Quill** has three extra commands which are accessed by pressing CTRL F3. Those are Load — which loads **QSpell** files into **Quill**; Find — which moves the cursor to the next mis-spelt word; and Characters.

Without an expansion board, and using microdrives, Find is almost redundant. It is quicker and easier to use the cursor keys. However, Find will remember what corrections have been made to text, while this in impossible using cursor keys.

The Edit option allows words to be added or deleted from the dictionary. About 1000 extra words can be added to the 25000 already there. You can create your own specialist dictionaries using the Clear option, and those can be reloaded as and when needed.

The Access option is a bonus for crossword enthusiasts. Its three options allow you to enter a word using question marks for unknown letters and find all possible matches for it. Or you can enter a string of letters and find the anagrams. You can even enter a string of letters and find all the words which can be made using the letters of that string. That produced an impressive 88 words from 'terminate' even if it did include 'I'm' as a three letter word.



Illustration — Stephen Wright

QSpell is a delight, being both fast and easy to use. It will become an important piece of software to everyone who uses Quill. *Mike Wright*

Publisher Eidersoft
Price £19.95
★★★★

QL Bank Account System

IN THE first piece of QL applications software aimed mainly at the home user, Kim Gouldstone has introduced a version of his **Spectrum Bank Account System.**

QL Bank Account System is designed to provide all the information you need about the state of your bank account.

The system is built round the transaction, which consists of a computer defined number, a transaction type code — cashcard, cheque etc — the date, a six figure reference number, a 15-character description, the amount, and an analysis code.

The amount is entered in pence, and while that is acceptable on the Spectrum where the point is badly situated, it is not so with the QL. Up to 10 analysis codes with descriptions can be used and, via the transaction analysis option, show the total and average expenditure for each group.

New details are held temporarily until the Update option is used, when they are added to any in the system file and all transactions are sorted by date. The sort routine is very slow.

An Enquiry option offers a range of details which can be displayed on the screen or printed. The Print Statement option produces a neat printout which shows the date, type, reference number, description, amount and balance for transactions from a given date. Debits are denoted with a minus sign. With the printout only using 60 of a possible 80 columns it would have been preferable to have separate debit and credit columns.

The manual is held on microdrive cartridge and loaded separately. Unfortunately, to check any details the manual must be reloaded. A built-in Help option would be a great improvement.

While it is comparatively easy to use and the printout is clear and easily readable, **QL Bank Account System** still looks like a Spectrum program. Better use could be made of the QL memory and power. *Mike Wright*

Publisher K J Gouldstone, 45 Burleigh Avenue, Wallington, Surrey SM6 7JG **Price** £8.00
★★

more business software on page 72

Thinking software?

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(cassette includes both disc and tape versions)

TASWORD 464

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POPULAR COMPUTING WEEKLY NOVEMBER 1984

A particularly sophisticated yet easy to use program. Now available on disc. The cassette version is supplied with instructions for transferring to disc.

TASWORD 464* Amstrad CPC 464 & 664 — cassette **£19·95**
disc **£22·95**

TASWORD 464-D

This is the new Tasword especially developed to utilise the capabilities of the CPC 464 and 664 disc drives. A major new feature is a powerful mail merge facility. Tasword 464-D will only run on, and is only supplied on, disc. ▷

TASWORD 464-D Amstrad CPC 464 & 664 — disc **£24·95**

*Available from larger branches of Boots

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Typical Tasprint output. Please note that different makes of printer produce different sized output

TASPRINT (Spectrum)

Drives all the printer interfaces compatible with TASWORD TWO and can be used to print TASWORD TWO text files as well as output from your own Basic programs.

TASPRINT 48K Spectrum — cassette **£9·90**
microdrive cartridge **£11·40**

TASPRINT EINSTEIN

Print TASWORD EINSTEIN text files in one or more of the TASPRINT fonts.

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TASPRINT QL includes a screen editor used to modify files created by other commercial software, such as QUILL, or by the user from BASIC. These modified files include TASPRINT control characters and may be printed, using TASPRINT, in one or more of the unique TASPRINT fonts.

TASPRINT QL Sinclair QL — microdrive cartridge **£19·95**

TASPRINT 464

Can be used to print AMSWORD/TASWORD 464 text files in addition to output from your own Basic programs. Drives the **Amstrad DMP-1** in addition to the printers listed above.

TASPRINT 464 Amstrad CPC 464 & 664 — cassette **£9·90**
disc **£12·90**

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. . . think Tasman

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The TASCOPY screen copiers print high resolution screen copies with different dot densities and patterns for the various screen colours. This gives the screen copies a shaded effect which presents on a monochrome scale the colours on the screen. With TASCOPY you can keep a permanent and impressive record of your screen pictures and diagrams. TASCOPY supports all the printers mentioned under TASPRINT.

TASCOPY (Spectrum & Interface 1)

The Spectrum TASCOPY is for use with the RS232 output on ZX Interface 1. It produces monochrome copies (in a choice of two sizes) as well as copies with the shaded "grey scale" effect described above.

TASCOPY ZX Spectrum	cassette	**£9·90**
	microdrive cartridge	**£11·40**

TASCOPY QL

TASCOPY QL adds new commands to the QL Superbasic. Execute these commands to print a shaded copy of the screen contents. Print the entire screen or just a specified window. TASCOPY QL also produces large "poster size" screen copies on more than one sheet of paper which can then be cut and joined to make the poster, and high speed small copies.

TASCOPY QL Sinclair QL	microdrive cartridge	**£12·90**

TASCOPY 464

Adds two new commands to the 464 Basic to give both a standard shaded screen copy as well as a "poster size" copy which is printed onto two or four sheets which can be cut and joined to make the poster.

TASCOPY 464 Amstrad CPC 464 & 664	cassette	**£9·90**
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TASMERGE ZX 48K Spectrum	**£10·90**

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Entrepreneur

A FRIGHTENING number of new businesses fail during their first year of operation. In many cases that can be traced to inadequate preparation before the company is set up.

Entrepreneur from Collins Soft, in the Brainpower series, is designed to provide a useful business tool together with programmed learning course for the skills necessary to understand and use it. **Decision Maker,** another in the series, was reviewed last month.

The teaching program aims to introduce the prospective businessman or women to double entry book-keeping and through that to make him aware of the different aspects of setting up and running a business, including possible sources of finance, cash flow, and likely costs. It consists of a series of six small programs, Using numbers, The balance sheet, Making a profit, Having enough cash, Value Added Tax and Balance sheet display.

Loading a program from cassette each time it is used is a nuisance, especially when you need to refer back. Unfortunately no provision for converting to microdrives has been made, although the packaging is designed to store up to three cartridges.

The programs are easy to use with each new stage often requiring only single key input. They are highly informative and presented in a way which makes you consider aspects you might otherwise miss.

The manual contains addresses of organisations which will give advice and help. Several of the addresses are out of date.

The applications program is designed to be used to formulate a business plan showing a company's expected performance in its first year. The plan is extensive enough to be presented to possible investors. Two versions, one for a single and one for a multi-product company, are provided on the one cassette.

Analyses showing the projected end of year inventory, costs, break even point, and monthly cash flows are produced. Information on the proposed initial methods of finance is added after which the cash flows are recalculated. Calculation of the cash flows is slow. The profit and loss account and balance sheet can then be displayed.

Finally, **Entrepreneur** produces a sensitivity analysis that shows the effects of a 10 per cent change on the major factors affecting profits; a ratio analysis which shows the average credit turnover; and a percentage for the profitability of the business.

Data can be edited when entered and at the end, so that modifications can be made to the business plan.

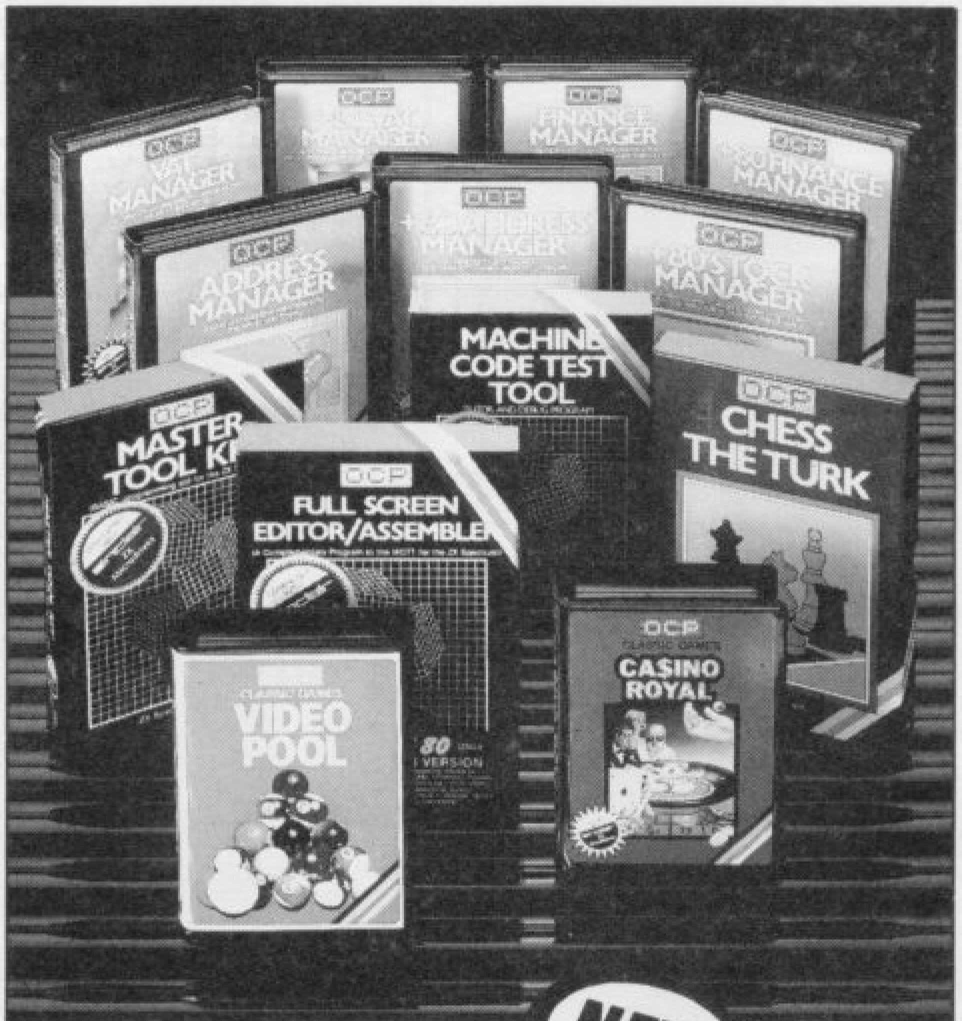
The teaching module is well set out and instructive but deals with a different subject to the applications program. Entering the data into the applications program is tedious, but having to re-enter all data in a section if one item is incorrect is painful.

Regardless of those deficiencies, this is a package which should prove useful to those looking to start a business and to those wishing to expand.

Mike Wright

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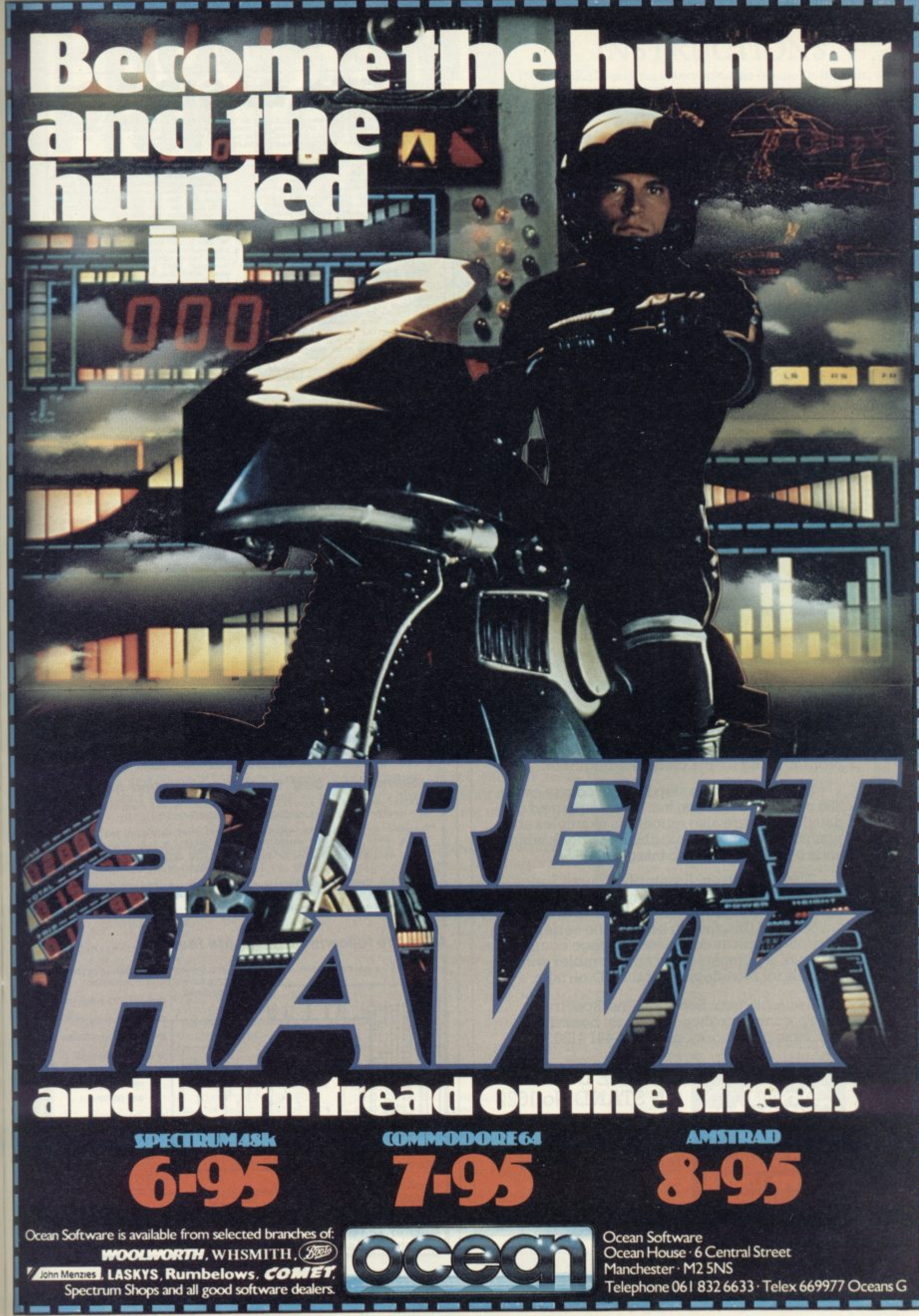
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```
10 FOR n=1 TO 10: PRINT n: NEXT n
```

as:

```
10 FOR n=1 TO 10
     PRINT n
   NEXT n
```

- KEYWORDS can all be entered by typing them in full, or by the "single entry" method, or both in the same line; e.g. the line: 10print"hello":if x=1 THEN goto 100 will be recognised and listed normally.
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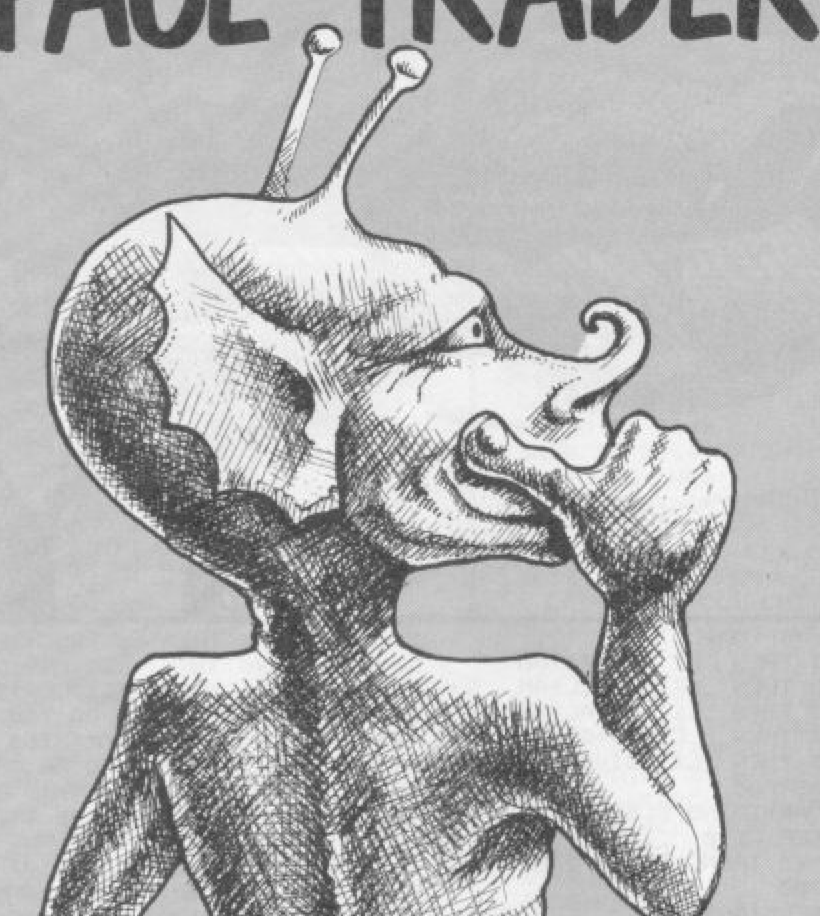
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PROGRAM PRINTOUT

SPACE TRADER



GRAPHICS INSTRUCTIONS

IN GENERAL, graphics abbreviations are enclosed in brackets, which should not be entered. A string of the same graphics character is represented in the form (3*A) which would be entered as AAA, where A is the graphics character. A space, where it is important to have the correct number of spaces, is indicated by (sp). Spaces in text will not normally be indicated. Where several graphics characters are used, they are separated by commas, which should not be entered. With Spectrum and QL listings the letter l has a flat top and the numeral 1 has a sloping top.

The above applies to all Sinclair machines. The following instructions are for specific machines.

ZX-81: ZX-81 listings are generally reproduced as they appear when you enter them, spaces and all. Where extensive graphics are used, REM statements will be inserted to provide a guide to the position of each character.

Spectrum: User-defined graphics are represented by underlined letters, without brackets. Type the appropriate letter while in graphics mode. The underline does not appear on the screen. Inverse characters have the letter i before them, e.g. iZ, iA, iP. Block graphic characters are indicated by g followed by the number of the appropriate key: g4 would mean the block graphics on key 4, ig4 the inverse of that graphic.

Control codes are indicated by cc before the character, and are obtained by pressing CAPS SHIFT while in extended mode. They do not appear on the screen but may change the colour of the cursor and will affect what is printed after them: cc3,i* would thus have the effect of printing an inverse asterisk in red.

QL: User-defined graphics on the QL are indicated by a description of the keys pressed to obtain them, underlined and in brackets. Thus (CTRL + 9) means press CTRL and 9 together. The same applies for unusual characters within the QL character set, which our printer is unable to reproduce.

MAKE A MILLION riding the spaceways as a carefree merchant in **Space Trader** by Steve Greaves of Hull.

Carefree? You'll be lucky to stay in business more than a few rounds as you peddle goods around the six planets. Work out who needs what, and you might stay ahead — but there's always pirates and maniacs in flying saucers to put a spanner in the works at the wrong moment. The game runs on a 48K Spectrum or Spectrum Plus.

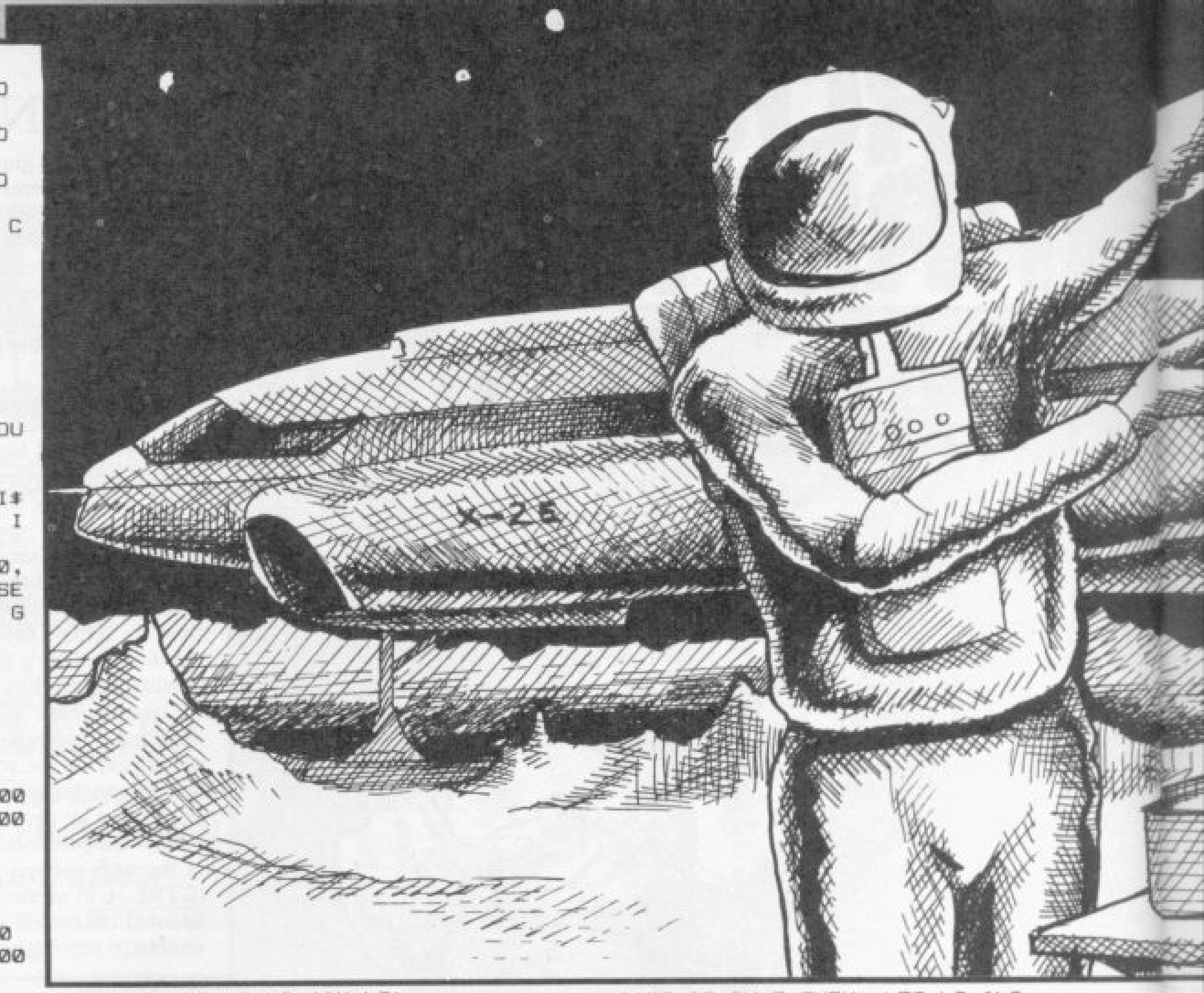
Space trader uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout.

```
   1 BORDER 0: PAPER 0: INK 6: C
LS
   5 GO SUB 9000
 130 REM **INSTRUCTIONS**
 140 PRINT AT 0,13;"TRADER
                   ********"
 150 PRINT AT 3,0;"YOU ARE A SPA
CE TRADER IN A FAR OFF GALAXY.YO
U MAKE MONEY BY    TRAVELLING AR
OUND THE PLANETS INTHE GALAXY,BU
YING AND SELLING   GOODS FOR A P
ROFIT.YOU START OFFWITH 10000 @
(@ IS THE CURRENCY)AND ONE SHIP.
IT COSTS 500 @ TO  FLY EACH SHIP
 FROM ONE PLANET TOANOTHER.ON YO
UR WAY TO ANOTHER  PLANET YOU MA
Y GET ROBBED OF    YOUR MONEY OR
 YOUR CARGO,GET    ATTACKED OR R
UN INTO A FLYING   SAUCER.THE GA
ME ENDS WHEN YOU   MAKE 1,000,00
0 @ OR RUN OUT OF  MONEY.
                           G O O
 D  L U C K . ."
 160 PRINT AT 21,4;"PRESS ANY KE
Y TO PLAY"
 170 PAUSE 0: CLS
 171 LET A$="COROLETH"
 172 LET B$="FRIDGIA"
 173 LET C$="WRITHULA"
 174 LET D$="XAGORIA"
 175 LET E$="GLATHORIN"
 176 LET F$="ASORTHIA"
 180 INPUT "ENTER YOUR NAME ";N$
: BEEP .1,0
 181 IF LEN N$>15 THEN  GO TO 18
0
 182 LET FO=0: LET GO=0: LET DI=
0: LET CL=0: LET AL=0
 183 LET SP=100: LET SH=1
 184 LET RO=0
 185 LET L$="COROLETH"
 190 LET MO=10000
 200 REM **Main game**
 202 IF MO>=1000000 THEN  GO TO
7000
 205 IF MO<0 THEN  GO TO 8000
 210 IF L$=A$ THEN  BORDER 1: PA
PER 1: INK 7
 211 IF L$=B$ THEN  BORDER 7: PA
PER 7: INK 1
 212 IF L$=C$ THEN  BORDER 3: PA
PER 3: INK 0
 213 IF L$=D$ THEN  BORDER 2: PA
PER 2: INK 6
 214 IF L$=E$ THEN  BORDER 6: PA
PER 6: INK 0
 215 IF L$=F$ THEN  BORDER 0: PA
PER 0: INK 4
 220 CLS
 225 PRINT AT 0,0;"(32*sp)";AT 6
,0;"(32*sp)";AT 21,0;"(32*sp)";A
T 14,0;"(32*sp)"
 226 FOR A=0 TO 21: PRINT AT A,0
;"(ig8)";AT A,31;"(ig8)": NEXT A
 227 FOR A=6 TO 13: PRINT AT A,1
5;"(ig8)": NEXT A
 230 PRINT AT 1,1;"SPACE TRADER
: ";N$
 240 PRINT AT 2,1;"LOCATION : ";
L$
 250 PRINT AT 3,1;"MONEY : ";MO;
" @"
 260 PRINT AT 4,1;"SHIPS : ";SH
 270 PRINT AT 5,1;"CARGO SPACE :
 ";SP
 280 PRINT AT 7,5;"CARGO"
 290 PRINT AT 9,1;"FOOD:";FO
 300 PRINT AT 10,1;"CLOTH:";CL
 310 PRINT AT 11,1;"ALCOHOL:";AL
 320 PRINT AT 12,1;"GOLD:";GO
 330 PRINT AT 13,1;"DIAMONDS:";D
I
 335 IF RO=1 THEN  GO TO 395
 340 IF L$=A$ THEN  GO SUB 1000
 350 IF L$=B$ THEN  GO SUB 1100
 360 IF L$=C$ THEN  GO SUB 1200
 370 IF L$=D$ THEN  GO SUB 1300
 380 IF L$=E$ THEN  GO SUB 1400
 390 IF L$=F$ THEN  GO SUB 1500
 400 PRINT AT 7,16;"LOCAL PRICES
"
 410 PRINT AT 9,16;"FOOD:";FOO
 420 PRINT AT 10,16;"CLOTH:";CLO
 430 PRINT AT 11,16;"ALCOHOL:";A
LC
 440 PRINT AT 12,16;"GOLD:";GOL
 450 PRINT AT 13,16;"DIAMONDS:";
DIA
 460 PRINT AT 15,12;"CHOICES"
 470 PRINT AT 17,2;"1 . BUY SOME
 GOODS";AT 18,2;"2 . SELL SOME G
OODS";AT 19,2;"3 . BUY ANOTHER S
HIP";AT 20,2;"4 . TAKE-OFF FROM
";L$
 480 INPUT "ENTER CHOICE (1 TO 4
) ";CH: BEEP .1,0
 490 IF CH<>1 AND CH<>2 AND CH<>
3 AND CH<>4 THEN  GO TO 480
```

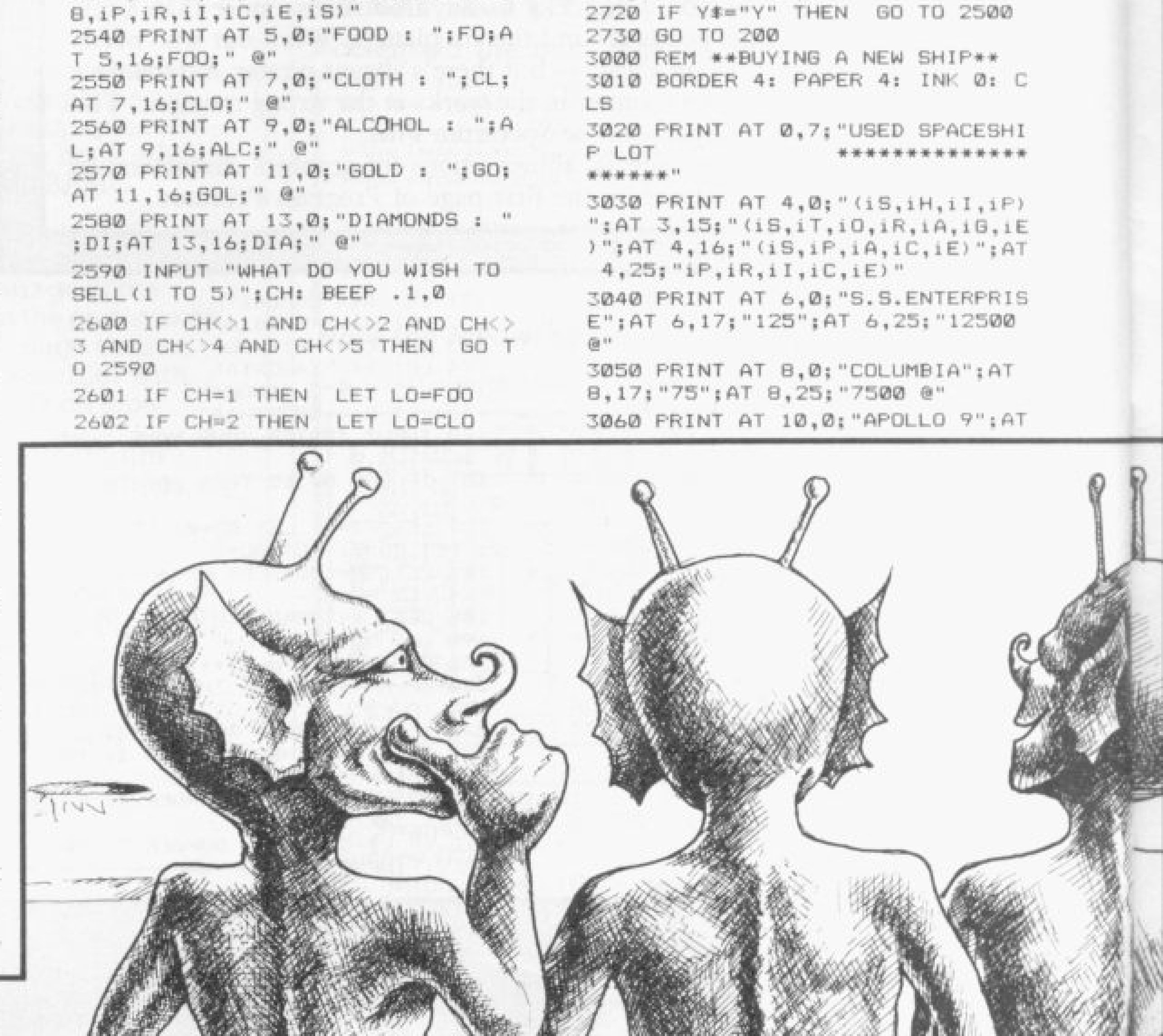
continued on page 78

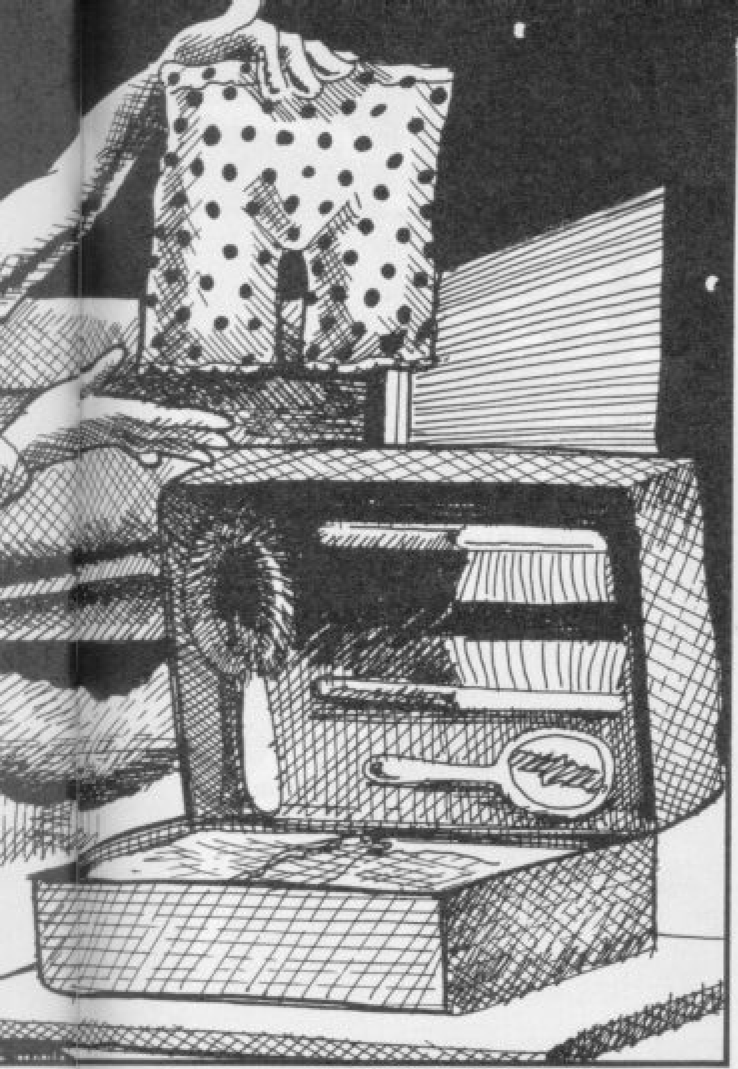
continued from page 77

```
 500 IF CH=1 THEN  LET RO=1: GO
TO 2000
 510 IF CH=2 THEN  LET RO=1: GO
TO 2500
 520 IF CH=3 THEN  LET RO=1: GO
TO 3000
 530 BORDER 0: PAPER 0: INK 7: C
LS
 535 LET RO=0
 540 PRINT AT 3,0;"1 . ";A$
 550 PRINT AT 5,0;"2 . ";B$
 560 PRINT AT 7,0;"3 . ";C$
 570 PRINT AT 9,0;"4 . ";D$
 580 PRINT AT 11,0;"5 . ";E$
 590 PRINT AT 13,0;"6 . ";F$
 600 PRINT AT 18,0;"WHERE DO YOU
 WANT TO GO ?"
 610 INPUT I$: BEEP .1,0
 620 IF I$<>A$ AND I$<>B$ AND I$
<>C$ AND I$<>D$ AND I$<>E$ AND I
$<>F$ THEN  GO TO 610
 630 IF I$=L$ THEN  PRINT AT 20,
0;"YOU'RE ALREADY AT ";L$: PAUSE
 100: PRINT AT 20,0;"(32*sp)": G
O TO 610
 640 LET L$=I$
 650 LET MO=MO-(500*SH)
 660 GO TO 3500
1000 LET FOO=INT (RND*30)+30
1010 LET CLO=INT (RND*100)+200
1020 LET ALC=INT (RND*100)+200
1030 LET GOL=INT (RND*2000)+1000
1040 LET DIA=INT (RND*1000)+5000
1050 RETURN
1100 LET FOO=INT (RND*70)+30
1110 LET CLO=INT (RND*100)+500
1120 LET ALC=INT (RND*50)+300
1130 LET GOL=INT (RND*750)+1250
1140 LET DIA=INT (RND*1500)+2500
1150 RETURN
1200 LET FOO=INT (RND*30)+120
1210 LET CLO=INT (RND*200)+400
1220 LET ALC=INT (RND*350)+400
1230 LET GOL=INT (RND*250)+2250
1240 LET DIA=INT (RND*500)+3000
1250 RETURN
1300 LET FOO=INT (RND*50)+100
1310 LET CLO=INT (RND*50)+200
1320 LET ALC=INT (RND*400)+200
1330 LET GOL=INT (RND*1250)+1250
1340 LET DIA=INT (RND*1000)+4500
1350 RETURN
1400 LET FOO=INT (RND*60)+60
1410 LET CLO=INT (RND*150)+300
1420 LET ALC=INT (RND*500)+500
1430 LET GOL=INT (RND*1000)+2000
1440 LET DIA=INT (RND*3000)+3000
1450 RETURN
1500 LET FOO=INT (RND*90)+40
1510 LET CLO=INT (RND*200)+200
1520 LET ALC=INT (RND*125)+675
1530 LET GOL=INT (RND*2000)+750
1540 LET DIA=INT (RND*2000)+2500
1550 RETURN
2000 REM **BUYING**
2010 BORDER 2: PAPER 2: INK 6: C
LS
2020 PRINT AT 0,13;"BUYING
                   ********"
2030 PRINT AT 3,0;"LOCAL PRICES"
2040 PRINT AT 5,0;"1 . FOOD : ";
FOO;" @"
2050 PRINT AT 7,0;"2 . CLOTH : "
;CLO;" @"
2060 PRINT AT 9,0;"3 . ALCOHOL :
 ";ALC;" @"
2070 PRINT AT 11,0;"4 . GOLD : "
;GOL;" @"
2080 PRINT AT 13,0;"5 . DIAMONDS
 : ";DIA;" @"
2090 PRINT AT 16,0;"MONEY : ";MO
;" @"
2100 PRINT AT 18,0;"CARGO SPACE
: ";SP
2110 PRINT AT 21,0;"WHICH PRODUC
T DO YOU WISH TO BUY"
2120 INPUT "1 TO 5  ";CH: BEEP .
1,0
2130 IF CH<>1 AND CH<>2 AND CH<>
3 AND CH<>4 AND CH<>5 THEN  GO T
O 2120
2131 IF CH=1 THEN  LET LO=FOO
2132 IF CH=2 THEN  LET LO=CLO
2133 IF CH=3 THEN  LET LO=ALC
2134 IF CH=4 THEN  LET LO=GOL
2135 IF CH=5 THEN  LET LO=DIA
2140 INPUT "HOW MUCH ? ";AM: BEE
P .1,0
2145 IF AM>SP THEN  GO TO 2140
2150 IF AM*LO>MO THEN  GO TO 214
0
```

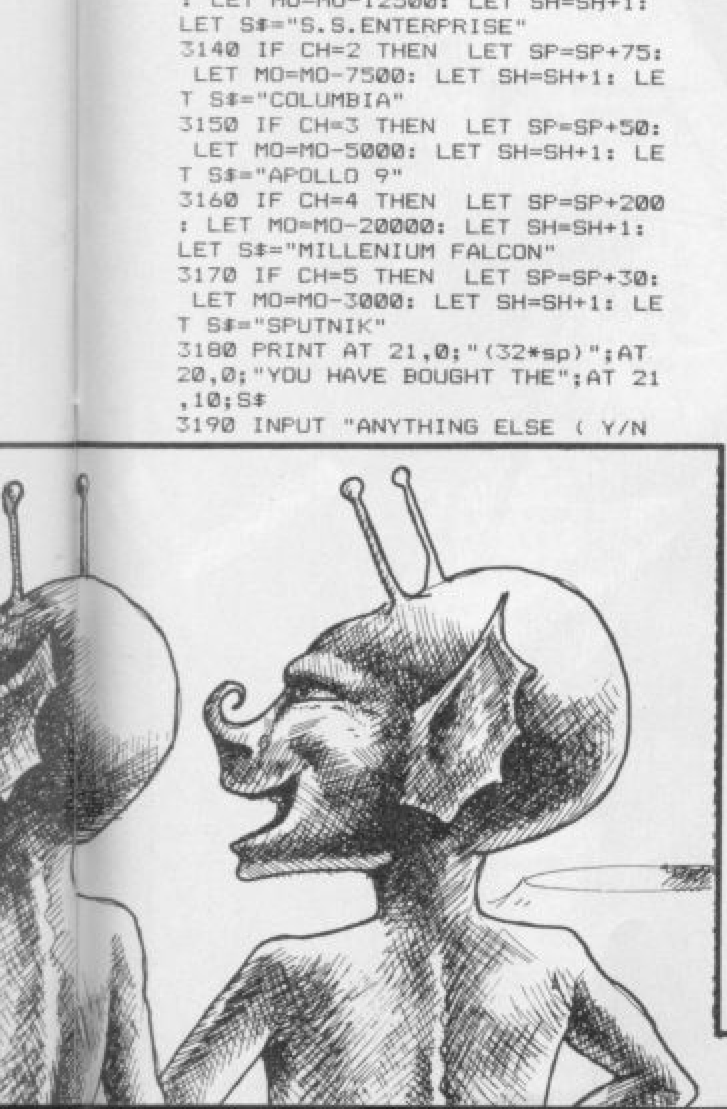



```
2160 LET MO=MO-(AM*LO)
2170 IF CH=1 THEN  LET FO=FO+AM
2171 IF CH=2 THEN  LET CL=CL+AM
2172 IF CH=3 THEN  LET AL=AL+AM
2173 IF CH=4 THEN  LET GO=GO+AM
2174 IF CH=5 THEN  LET DI=DI+AM
2180 LET SP=SP-AM
2190 INPUT "ANYTHING ELSE ( Y/N
) ? ";Y$: BEEP .1,0
2200 IF Y$="Y" THEN  GO TO 2000
2210 GO TO 200
2500 REM **SELLING**
2510 BORDER 5: PAPER 5: INK 1: C
LS
2520 PRINT AT 0,13;"SELLING
                   *********"
2530 PRINT AT 3,0;"(iC,iA,iR,iG,
iO)";AT 3,16;"(iL,iO,iC,iA,iL,ig
8,iP,iR,iI,iC,iE,iS)"
2540 PRINT AT 5,0;"FOOD : ";FO;A
T 5,16;FOO;" @"
2550 PRINT AT 7,0;"CLOTH : ";CL;
AT 7,16;CLO;" @"
2560 PRINT AT 9,0;"ALCOHOL : ";A
L;AT 9,16;ALC;" @"
2570 PRINT AT 11,0;"GOLD : ";GO;
AT 11,16;GOL;" @"
2580 PRINT AT 13,0;"DIAMONDS : "
;DI;AT 13,16;DIA;" @"
2590 INPUT "WHAT DO YOU WISH TO
SELL(1 TO 5)";CH: BEEP .1,0
2600 IF CH<>1 AND CH<>2 AND CH<>
3 AND CH<>4 AND CH<>5 THEN  GO T
O 2590
2601 IF CH=1 THEN  LET LO=FOO
2602 IF CH=2 THEN  LET LO=CLO
2603 IF CH=3 THEN  LET LO=ALC
2604 IF CH=4 THEN  LET LO=GOL
2605 IF CH=5 THEN  LET LO=DIA
2620 INPUT "HOW MUCH DO YOU WANT
 TO SELL ?  ";AM: BEEP .1,0
2630 IF CH=1 AND AM>FO OR CH=2 A
ND AM>CL OR CH=3 AND AM>AL OR CH
=4 AND AM>GO OR CH=5 AND AM>DI T
HEN  GO TO 2620
2640 LET MO=MO+(AM*LO)
2650 IF CH=1 THEN  LET FO=FO-AM
2660 IF CH=2 THEN  LET CL=CL-AM
2670 IF CH=3 THEN  LET AL=AL-AM
2680 IF CH=4 THEN  LET GO=GO-AM
2690 IF CH=5 THEN  LET DI=DI-AM
2700 LET SP=SP+AM
2710 INPUT "ANYTHING ELSE (Y/N)
? ";Y$: BEEP .1,0
2720 IF Y$="Y" THEN  GO TO 2500
2730 GO TO 200
3000 REM **BUYING A NEW SHIP**
3010 BORDER 4: PAPER 4: INK 0: C
LS
3020 PRINT AT 0,7;"USED SPACESHI
P LOT              **************
******"
3030 PRINT AT 4,0;"(iS,iH,iI,iP)
";AT 3,15;"(iS,iT,iO,iR,iA,iG,iE
)";AT 4,16;"(iS,iP,iA,iC,iE)";AT
 4,25;"iP,iR,iI,iC,iE)"
3040 PRINT AT 6,0;"S.S.ENTERPRIS
E";AT 6,17;"125";AT 6,25;"12500
@"
3050 PRINT AT 8,0;"COLUMBIA";AT
8,17;"75";AT 8,25;"7500 @"
3060 PRINT AT 10,0;"APOLLO 9";AT
```





```
 10,17;"50";AT 10,25;"5000 @"
3070 PRINT AT 12,0;"MILLENIUM FA
LCON";AT 12,17;"200";AT 12,25;"2
0000 @"
3080 PRINT AT 14,0;"SPUTNIK";AT
14,17;"30";AT 14,25;"3000 @"
3100 PRINT AT 21,0;"ENTER YOUR C
HOICE ( 1 TO 5 )"
3110 INPUT CH: BEEP .1,0
3120 IF CH<>1 AND CH<>2 AND CH<>
3 AND CH<>4 AND CH<>5 THEN  GO T
O 3110
3125 IF CH=1 AND MO<12000 OR CH=
2 AND MO<7500 OR CH=3 AND MO<500
0 OR CH=4 AND MO<20000 OR CH=5 A
ND MO<3000 THEN  PRINT AT 21,0;"
YOU CAN'T AFFORD IT
": PAUSE 100: GO TO 3100
3130 IF CH=1 THEN  LET SP=SP+125
: LET MO=MO-12500: LET SH=SH+1:
LET S$="S.S.ENTERPRISE"
3140 IF CH=2 THEN  LET SP=SP+75:
 LET MO=MO-7500: LET SH=SH+1: LE
T S$="COLUMBIA"
3150 IF CH=3 THEN  LET SP=SP+50:
 LET MO=MO-5000: LET SH=SH+1: LE
T S$="APOLLO 9"
3160 IF CH=4 THEN  LET SP=SP+200
: LET MO=MO-20000: LET SH=SH+1:
LET S$="MILLENIUM FALCON"
3170 IF CH=5 THEN  LET SP=SP+30:
 LET MO=MO-3000: LET SH=SH+1: LE
T S$="SPUTNIK"
3180 PRINT AT 21,0;"(32*sp)";AT
20,0;"YOU HAVE BOUGHT THE";AT 21
,10;S$
3190 INPUT "ANYTHING ELSE ( Y/N
) ? ";Y$: BEEP .1,0
3200 IF Y$="Y" THEN  GO TO 3000
3210 GO TO 200
3500 REM **TAKING OFF**
3510 BORDER 2: PAPER 0: INK 7: C
LS
3515 FOR C=0 TO 15
3520 LET A=INT (RND*9): LET B=IN
T (RND*32)
3525 PRINT AT A,B;".": NEXT C
3530 PLOT 0,76: DRAW 35,-76
3540 PLOT 18,40: DRAW 10,50: DRA
W 4,-20: DRAW 3,7: DRAW 20,-46:
DRAW 100,0: DRAW 9,71: DRAW 40,0
: DRAW 9,-71: DRAW 42,10
3550 PRINT AT 16,10;"(ig8)";AT 1
7,10;"(ig8,ig3,ig1)"
3560 PRINT AT 14,8;"(ig8)";AT 15
,8;"(ig8)";AT 16,8;"(ig8)";AT 17
,7;"ig3,ig8,ig5)"
3570 PRINT AT 17,17;"(2*ig8)";AT
 16,18;"!"
3580 PRINT AT 8,22; INK 2;"A"
3582 IF MO<0 THEN  GO TO 4000
3590 LET Z=INT (RND*20)
3595 IF Z=0 OR Z=1 OR Z=2 OR Z=3
 OR Z=4 OR Z=5 OR Z=6 THEN  GO T
O 4000
3600 IF Z=7 OR Z=8 THEN  GO TO 4
200
3610 IF Z=9 OR Z=10 THEN  GO TO
4400
3615 IF Z=11 OR Z=12 OR Z=13 THE
N  GO TO 4600
3620 IF Z=14 OR Z=15 OR Z=16 THE
N  GO TO 4800
3630 LET Y=INT (RND*5)
3631 IF Y=0 THEN  LET X$="FOOD":
 LET SP=SP+FO: LET FO=0
3632 IF Y=1 THEN  LET X$="CLOTH"
: LET SP=SP+CL: LET CL=0
3633 IF Y=2 THEN  LET X$="ALCOHO
L": LET SP=SP+AL: LET AL=0
3634 IF Y=3 THEN  LET X$="GOLD":
 LET SP=SP+GO: LET GO=0
3635 IF Y=4 THEN  LET X$="DIAMON
DS": LET SP=SP+DI: LET DI=0
3640 PRINT AT 0,0;"TWO IMPERIAL
GUARDS SEARCHED     YOUR SHIPS AN
D STOLE ALL YOUR    CARGO OF ";X$
3650 GO TO 4000
3999 STOP
4000 PRINT AT 17,14; INK 6;"FE"
4010 FOR Z=-60 TO 60: BEEP .007,
Z: NEXT Z
4020 FOR Z=17 TO 8 STEP -1: PRIN
T AT Z,14; INK 6;"FE": BEEP .01,
Z: PAUSE 4: PRINT AT Z,14;"(2*sp
)": NEXT Z
4025 PRINT AT 8,14; INK 6;"FE":
PAUSE 20: PRINT AT 8,16; INK 2;"
H": BEEP .1,30
4030 FOR Z=14 TO 0 STEP -1
4040 PRINT AT 8,Z; INK 6;"FE ":
PAUSE 3: NEXT Z
4050 PRINT AT 8,0;"(2*sp)"
4060 PAUSE 100: GO TO 200
4200 LET X=INT (RND*4)
4201 IF X=0 THEN  LET Y=2
4202 IF X=1 THEN  LET Y=4
4203 IF X=2 THEN  LET Y=10
4204 IF X=3 THEN  LET Y=5
4210 PRINT AT 0,0;"YOU WE'RE ROB
BED BY TWO THIEFS  BEFORE YOU TO
OK OFF.THEY MADE    OFF WITH ";MO
/Y;" @"
4220 LET MO=MO-(MO/Y)
4230 GO TO 4000
4400 LET A=INT (RND*3)
4401 IF A=0 THEN  LET Y=2
4402 IF A=1 THEN  LET Y=4
4403 IF A=2 THEN  LET Y=10
4410 PRINT AT 0,0;"YOU WE'RE HI-
JACKED IN SPACE BY PIRATES WHO S
TOLE 1/";Y;" OF YOUR     CARGO"
4415 LET SP=SP+(FO/Y)+(CL/Y)+(AL
/Y)+(GO/Y)+(DI/Y)
4420 LET FO=FO-(FO/Y)
4430 LET CL=CL-(CL/Y)
4440 LET AL=AL-(AL/Y)
4450 LET GO=GO-(GO/Y)
4460 LET DI=DI-(DI/Y)
4480 GO TO 4000
4600 PRINT AT 17,14; INK 6;"FE"
4610 FOR W=30 TO 14 STEP -1: PRI
NT AT 3,W; INK 7;"CD ": BEEP .07
,30: PAUSE 4: NEXT W: PAUSE 30
4620 FOR W=4 TO 16: PRINT AT W,1
4;"**": BEEP .07,-W-10: PAUSE 1:
 PRINT AT W,14;"(2*sp)": NEXT W
4630 PRINT AT 17,14; INK 2;"GG"
4640 BEEP 2,-40
4645 LET X=INT (RND*3000)+1000
4650 PRINT AT 0,0;"AN IMPERIAL S
AUCER BLEW UP YOUR SHIP AND IT C
OST ";X;" @ TO        REPAIR IT"
4660 LET MO=MO-X
4670 PAUSE 200: GO TO 200
4800 PRINT AT 17,14; INK 6;"FE"
4810 FOR Z=-60 TO 60: BEEP .007,
Z: NEXT Z
4820 FOR z=17 TO 8 STEP -1
4830 PRINT AT Z,14; INK 6;"FE":
BEEP .01,z: PAUSE 3: PRINT AT z,
14;"(2*sp)": NEXT z
4835 PRINT AT 8,14; INK 6;"FE":
PAUSE 20: PRINT AT 8,16; INK 2;"
H": BEEP .1,30
4840 PRINT AT 8,14; INK 6;"FE"
4845 LET z=1: LET x=0
4850 FOR q=14 TO 7 STEP -1
4860 PRINT AT 8,q; INK 6;"FE ";:
AT z,x; INK 4;"B": BEEP .07,0: P
AUSE 3: PRINT AT Z,X;"(sp)": LET
 z=z+1: LET x=x+1: NEXT q
4870 PRINT AT 8,q+1; INK 2;"GG":
 BEEP 2,-40
4875 LET X=INT (RND*4000)
4880 PRINT AT 0,0;"YOU RAN INTO
A FLYING SAUCER IN THE AIR.IT CO
ST ";X;" @ TO REPAIR"
4890 LET MO=MO-X
4900 PAUSE 200: GO TO 200
7000 BORDER 2: PAPER 0: INK 7: C
LS
7005 PRINT AT 10,7;"(iC,iO,iN,iG
,iR,iA,iT,iU,iL,iA,iT,iI,iO,iN,i
S)";AT 13,5;"(iY,iO,iU,i',iR,iE,
ig8,iA,ig8,iM,iI,iL,iL,iI,iO,iN,
iA,iI,iR,iE)"
7010 FOR A=0 TO 50: LET B=INT (R
ND*8)
7020 BORDER B: NEXT A
7030 BORDER 2
7040 BEEP .3,0: BEEP .2,2: BEEP
.2,4: BEEP .4,5: BEEP .3,0: BEEP
 .2,5: BEEP .2,4: BEEP .2,5: BEE
P .2,7: BEEP .2,2: BEEP .2,2: BE
EP .3,4: BEEP .3,5: BEEP .4,9: B
EEP .2,7: BEEP .2,7: BEEP .2,5:
BEEP .2,5: BEEP .2,4: BEEP .2,2:
 BEEP .2,4: BEEP .5,5
7050 CLS
7060 PRINT AT 1,1;"WELL DONE ";N
$
7070 PRINT AT 3,1;"YOU'VE ACHIEV
ED YOUR AIM AND     BECOME A MILL
IONAIRE.NOW YOU     CAN RETIRE TO
 A PEACEFUL PLANET FOR THE REST
OF YOUR LIFE."
7080 GO TO 8500
8000 BORDER 0: PAPER 0: INK 7: C
LS
8010 PRINT AT 0,0;"YOU'RE SKINT
";N$
8020 PRINT AT 2,1;"YOU'VE LOST E
VERYTHING,YOU'RE    SHIP,MONEY AN
D HOME.THE PEOPLE   YOU OWE MONEY
 TO HAVE BANISHED   YOU TO A PRIS
ON SHIP IN THE      FROZEN WASTES
..FOREVER....."
8500 PRINT AT 10,1;"1 . SAVE 'SP
ACE TRADER'";AT 12,1;"2 . LOAD T
HE NEXT PROGRAM";AT 14,1;"3 . NE
W 'SPACE TRADER'";AT 16,1;"4 . P
LAY ANOTHER GAME"
8510 INPUT "ENTER YOUR CHOICE (
1 TO 4 )? ";CH: BEEP .1,0
8520 IF CH<>1 AND CH<>2 AND CH<>
3 AND CH<>4 THEN  GO TO 8510
8530 IF CH=1 THEN  SAVE "SP.TRAD
ER" LINE 1: PRINT AT 20,1;"VERYI
FYING 'SP.TRADER'": VERIFY "SP.T
RADER"
8540 IF CH=2 THEN  LOAD ""
8550 IF CH=3 THEN  NEW
8560 RUN
8999 STOP
9000 FOR A=USR "A" TO USR "H"+7:
 READ AA: POKE A,AA: NEXT A
9001 DATA 60,255,60,0,126,255,21
9,195
9002 DATA 0,0,0,24,36,255,36,0
9003 DATA 0,0,2,7,9,255,9,2
9004 DATA 0,0,32,224,144,255,144
,64
9005 DATA 4,12,255,255,255,96,48
,255
9006 DATA 0,0,31,63,255,48,24,25
5
9007 DATA 34,56,83,29,12,240,32,
50
9008 DATA 2,28,0,127,0,28,2,0
9009 RETURN
```



MASOCHISTS will love **Dead Eyed Dick**, a horrendously difficult levels and ladders game by David Fryett of Abbey Wood, London.

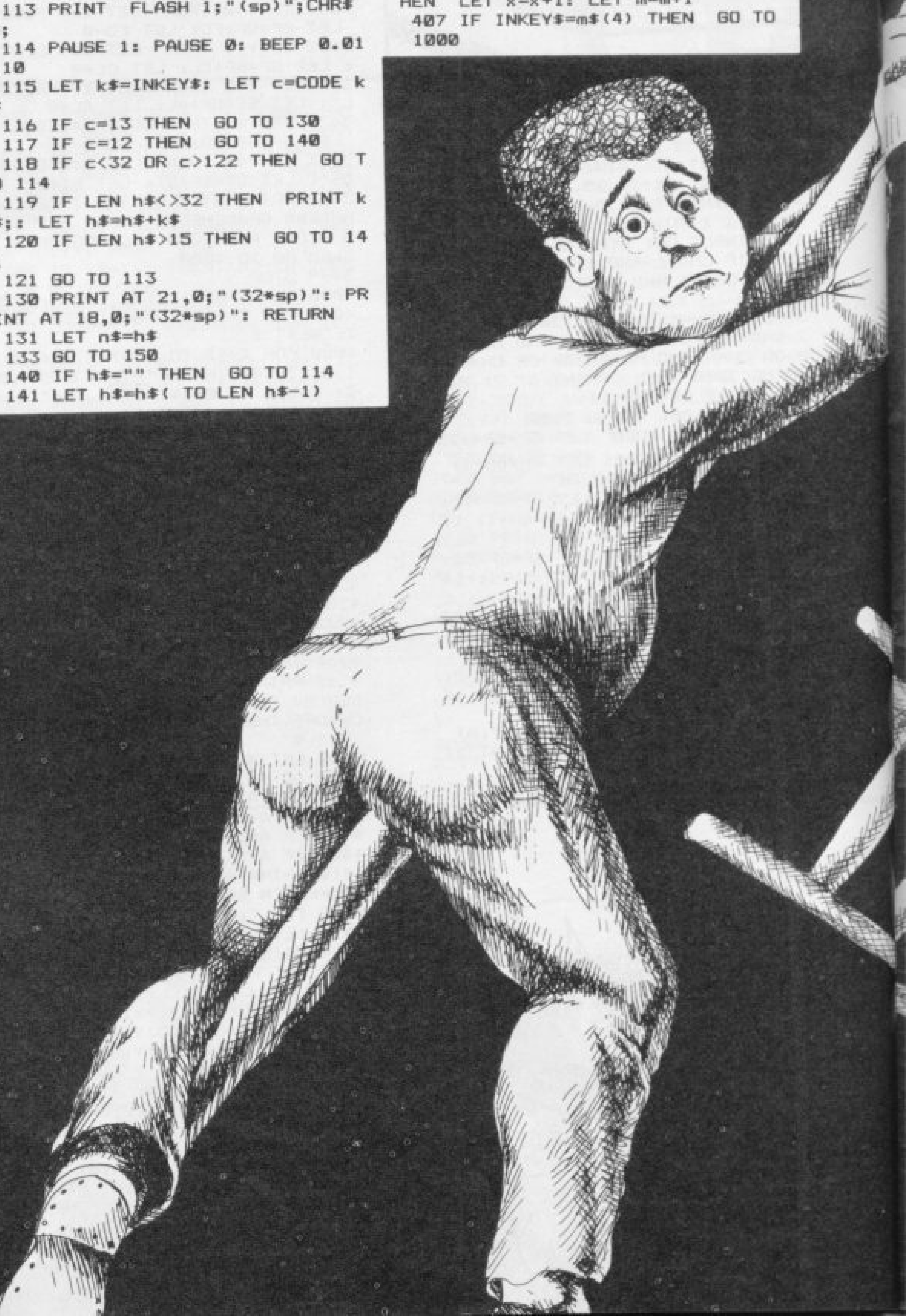
Guide Dick around five screens of ovoid bricks, flashing footholds, ramps and poles to collect 30 pieces of the secret code. You will have to be accurate to a single pixel if you are going to win. This one is absolutely vile, and runs on the 48K Spectrum or Spectrum Plus. **Jet Set Willy**, eat your heart out.

There are two listings. Type in the first and save it with SAVE "name" LINE 1. Then type in the second listing and RUN it. The machine code will be POKEd into memory and automatically saved onto the tape. Then the first listing will run and load the code automatically.

The program uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before typing in the listings.

Listing 1

```
   1 REM DEAD EYED
   2 CLEAR 64499
   3 LOAD ""CODE 64500
   4 LET h$="D.FRYETT": LET hi=5
50: LET sc=0: LET pp=0: DIM m$(5
): LET m$(1)="o": LET m$(2)="p":
 LET m$(3)="w": LET m$(4)="q": L
ET m$(5)="e"
   5 BORDER 2: PAPER 0: INK 6: B
RIGHT 1: PRINT #1;: CLS
   6 LET m=0: LET d=0
   7 LET sh=1: LET qe=5
   8 LET co=0: LET jj=0
   9 LET me=3: GO SUB 9500
  10 DEF FN o(x)=x/8-.4
  11 DEF FN p(y)=y/8-21.4
  12 CLS : PRINT TAB 9; INK 7;"D
EAD EYED DICK": PRINT AT 9,0; IN
K 7;"KEYS"
  13 LET a$="": RESTORE 3650: FO
R f=1 TO 5: INK RND*6+1: READ a$
: PRINT AT f+10,0;a$;"-(sp)";m$(
f): NEXT f: PRINT AT 0,0;""
  14 LET fi=0: GO SUB 270: PRINT
 AT 2,0;
  15 PRINT "D TO DEFINE KEYS"'"S
 TO START"'"I TO PRINT INSTRUCTI
ONS"
  16 IF INKEY$="s" THEN  GO TO 2
0
  17 IF INKEY$="d" THEN  GO TO 3
500
  18 IF INKEY$="i" THEN  GO TO 5
50
  19 GO TO 16
  20 IF pp=0 THEN  CLS : PRINT A
T 11,10; PAPER 2; FLASH 1;"PLEAS
E WAIT": GO SUB 500: GO SUB 7800
  45 REM ***SETUP SCREEN*******
  50 CLS : RESTORE 4999+sh: FOR
f=1 TO 28: READ a,b: PRINT AT a,
b; INK RND*6+1;CHR$ 145;CHR$ 146
  51 NEXT f: FOR f=154 TO 159: R
EAD g,h: PRINT AT g,h; INK RND*6
+1; FLASH 1;CHR$ f: NEXT f: READ
 b,n,z: LET x=b: LET y=n: LET am
=z-INT (RND*10)
  52 LET x1=x: LET y1=y
  53 GO SUB 799+sh
  54 PRINT #1; INK 7; PAPER 2;"A
MOUNT OF MOVES ALLOWED ARE ";am;
"(sp)"
  55 PRINT AT 0,21; INK 4;"SCREE
N:- 00"
  56 IF sh<10 THEN  PRINT AT 0,3
1; INK 4;sh
  57 IF sh>9 THEN  PRINT AT 0,30
; INK 4;sh
  59 REM *****PRINT CODES*******
  99 GO TO 350
 100 STOP
 104 IF sc<hi THEN  RETURN
 105 PRINT  INK 2; PAPER 6; BRIG
HT 1; FLASH 1;"NEW HIGH SCORE"
 106 FOR f=1 TO 3: GO SUB 200: N
EXT f
 107 LET hi=sc
 108 PRINT AT 18,0;"PLEASE ENTER
 YOUR NAME."
 110 PRINT AT 21,0;"(32*sp)"
 111 LET h$=""
 112 PRINT AT 21,0;
 113 PRINT  FLASH 1;"(sp)";CHR$
8;
 114 PAUSE 1: PAUSE 0: BEEP 0.01
,10
 115 LET k$=INKEY$: LET c=CODE k
$
 116 IF c=13 THEN  GO TO 130
 117 IF c=12 THEN  GO TO 140
 118 IF c<32 OR c>122 THEN  GO T
O 114
 119 IF LEN h$<>32 THEN  PRINT k
$;: LET h$=h$+k$
 120 IF LEN h$>15 THEN  GO TO 14
1
 121 GO TO 113
 130 PRINT AT 21,0;"(32*sp)": PR
INT AT 18,0;"(32*sp)": RETURN
 131 LET n$=h$
 133 GO TO 150
 140 IF h$="" THEN  GO TO 114
 141 LET h$=h$( TO LEN h$-1)
 142 IF LEN h$<>31 THEN  PRINT "
(sp)";CHR$ 8;
 143 PRINT CHR$ 8;"(sp)";CHR$ 8;
 144 GO TO 113
 199 RETURN
 200 RESTORE 210
 201 FOR f=1 TO 8: READ t,n
 202 BEEP t,n: NEXT f
 205 RETURN
 210 DATA 0.1,11,0.1,11,0.8,16,0
.05,11,0.05,16,0.05,11,0.05,16,1
,20
 270 INK 5: PRINT AT 6,0;"HI SCO
RE:- ";hi
 271 PRINT AT 7,0;"BY: ";h$: INK
 6
 275 RETURN
 349 STOP
 398 PRINT AT 0,13; INK 5;"MEN:
";me;AT 0,0; INK 3;"MOVES:- "
 399 REM *****START OF GAME****
 400 PRINT AT 0,8; INK 3;m
 401 IF POINT (x+5,y-8)<>1 AND P
OINT (x+1,y-8)<>1 THEN  GO TO 70
00
 403 LET d=0
 405 IF INKEY$=m$(1) AND x>1 THE
N  LET x=x-1: LET m=m+1
 406 IF INKEY$=m$(2) AND x<249 T
HEN  LET x=x+1: LET m=m+1
 407 IF INKEY$=m$(4) THEN  GO TO
 1000
```



DEAD EYED DICK



```
 408 IF INKEY$=m$(3) THEN  GO TO
1500
 409 IF INKEY$=m$(5) THEN  GO TO
2000
 480 RANDOMIZE x AND y=shape+USR
64500
 481 BEEP .04,0
 483 RANDOMIZE x AND y=shape+USR
64500
 484 IF ATTR (FN p(y),FN o(x))>1
92 AND fi=0 THEN  GO SUB 900
 490 GO TO 400
 499 REM *******GRAPHICS*******
 500 RESTORE 600: FOR i=USR "a"
TO USR "p"+7
 501 READ d
 502 POKE i,d
 503 NEXT i
 504 LET shape=144
 505 RETURN
 509 REM **ALL SCREENS FINSHED**
 510 CLS : PRINT TAB 10; BRIGHT
1; INK 6; PAPER 2; FLASH 1;"WELL
DONE"'': INK 5
 511 PRINT "FANTANSTIC..........
...........BRILLIANT...........
............UNBELIEVABLE........
..........."'''"THE IMPOSSIBLE H
AS BEEN DONE     YOU HAVE COMPLET
ED ALL THE       SCREENS I SUPPOS
E THE BEST       THING I CAN DO N
OW IS GIVE YOU   2000 POINTS AND
PUT YOU BACK ON SCREEN 1"
 512 GO SUB 200: PAUSE 50: FOR f
=0 TO 50: BEEP .01,RND*60: NEXT
f: PRINT '''"PRESS ANY KEY TO ST
ART SCREEN 1"
 513 INK 6: LET sc=sc+2000: LET
sh=1: LET shape=144: LET fi=0: L
ET d=0: LET pp=0: FOR f=0 TO 10:
 NEXT f
 514 IF INKEY$<>"" THEN  GO TO 4
5
 515 GO TO 514
 539 REM ***********************
 540 REM ***********************
 541 REM *****INSTRUCTIONS*****
 550 CLS
 551 PRINT TAB 10; INK 5; PAPER
1; BRIGHT 1; FLASH 1;"INSTRUCTIO
NS"
 552 LET i$="HI  MY NAME IS DICK
          I FEEL THAT I SHOUL
D WARN YOU    THAT THIS GAME IS A
CCURATE TO 1 PIXEL SO YOU WILL N
EED TO BE     DEAD EYED DICK TO C
OMPLETE JUST ONE OF THE MANY SCR
EENS.         I'M NOT GOING TO TE
LL YOU TOO    MUCH BUT I WILL TEL
L YOU THAT    YOU HAVE TO COLLECT
 SIX PARTS    OF A SECRET CODE TO
 COMPLETE A   SCREEN THE REST IS
FOR YOU TO    FIND OUT.THIS GAME
COULD KEEP    YOU AMUSED FOR WEEK
S MONTHS WHO KNOWS MAYBE EVEN YE
ARS.          GOOD LUCK....."
 553 LET c=1: LET t=3: LET h=0:
LET w=LEN i$: LET k=32
 554 REM ******************
 555 FOR f=h+1 TO w
 557 IF f=k THEN  GO SUB 561
 558 BEEP .01,40: PRINT AT t,f-c
;i$(f)
 559 NEXT f: REM **********
 560 GO TO 569
 561 LET k=k+32: LET t=t+1: LET
c=c+32: RETURN
 569 PRINT '"EXTRA MAN AWARDED A
T 1000 POINTS"''"PRESS ANY KEY T
O RETURN TO MENU"
 570 FOR f=0 TO 60: NEXT f
 571 IF INKEY$="" THEN  GO TO 57
1
 572 GO TO 12
 600 DATA 56,56,56,254,56,68,68,
68
 601 DATA 63,104,208,168,192,224
,124,63
 602 DATA 252,22,47,21,11,55,254
,252
 603 DATA 24,24,10,60,8,21,34,19
2,24,24,80,60,16,168,68,3,24,24,
8,28,8,53,194,0
 604 DATA 24,24,16,56,16,188,67,
0,24,24,16,56,82,28,32,192,24,24
,8,28,74,56,4,3
 605 DATA 16,56,124,16,16,16,16,
16,0,0,238,136,238,40,238,0,0,0,
238,138,142,140,234,0,0,0,238,13
2,196,132,228,0
 606 DATA 0,0,224,128,238,128,22
4,0,0,0,238,138,138,138,238,0,0,
0,206,168,174,168,206,0
 700 REM ****FINSHED SCREEN****
 701 FOR f=0 TO 31: RANDOMIZE US
R 64300: RANDOMIZE USR 64350: NE
XT f: BEEP 01,60: LET sec=0: CLS
 : PRINT AT 5,11; INK 4; PAPER 1
; FLASH 1;" KLMNOP ": FOR f=0
TO 7
 702 LET sec=INT (RND*90): IF se
c<48 OR sec>27 AND sec<65 THEN
GO TO 702
 703 BEEP .01,10: PRINT AT 7,11+
f; INK 5;CHR$ sec: NEXT f: PRINT
 : PRINT
 704 IF m>am THEN  GO TO 750
 705 LET shape=144: PRINT "SCREE
N ";sh;" COMPLETED"
 706 LET sc=sc+100*sh: LET sc=sc
-INT (m/15): PRINT 100*sh;" POIN
TS AWARDED": PRINT "YOU HAVE SCO
RED ";sc;" POINTS": LET sh=sh+1:
 IF sc>1000 AND jj=0 THEN  GO SU
B 720
 707 FOR f=0 TO 400: NEXT f: IF
sh-1=qe THEN  GO TO 510
 708 PRINT "PRESS ANY KEY TO TRA
NSPORT TO    SCREEN ";sh;" PLEASE
": LET m=0: LET fi=0: LET co=0:
FOR f=0 TO 50: NEXT f
 709 IF INKEY$="" THEN  GO TO 70
9
 710 GO TO 45
 711 STOP
 720 GO SUB 200: LET jj=1
 721 PRINT "EXTRA MAN AWARDED YO
U HAVE          SCORED OVER 1000 POI
NTS"
 722 LET me=me+1
 725 RETURN
 750 PRINT
 755 LET m=0: LET fi=0: LET co=0
 756 LET x=245: LET y=15
 795 PRINT "YOU HAVE TAKEN MORE
MOVES THEN  ALLOWED YOU,WILL HAV
E TO ATTEMPTSCREEN ";sh;" AGAIN.
": LET m=0: LET pp=0: LET fi=0
 796 LET shape=144: FOR f=0 TO 4
00: NEXT f: CLS : GO TO 45
 797 REM **********************
 798 REM **********************
 799 REM **********************
 800 PLOT 245,16: PLOT 40,120: D
RAW 40,3: PRINT AT 21,30;"(ig2,i
g7)";AT 9,13; FLASH 1; BRIGHT 0;
"(g3,ig3)": PRINT AT 12,7;"__(ig
6)";AT 13,6;"-": PLOT 165,110: D
RAW -50,17: PLOT 155,2: DRAW -80
,20: DRAW -10,13: RETURN
 801 PRINT AT 20,30;"(ig8)": PLO
T 80,23: PLOT 79,39: DRAW 0,23:
PLOT 205,0: DRAW 50,30: PLOT 5,2
0: DRAW 0,88: PLOT 150,100: DRAW
 18,0: PLOT 190,100: PLOT 200,10
0: DRAW 47,-8: PRINT AT 12,31;"E
": PRINT AT 16,31; BRIGHT 0;"E";
AT 14,30;"(g4,g1)": PLOT 253,100
: RETURN
 802 PLOT 126,50: DRAW -30,10: P
LOT 130,50: DRAW 30,10: PRINT AT
 19,30; BRIGHT 0; FLASH 1;"(ig6,
g6)": PRINT AT 7,15; BRIGHT 0; F
LASH 1;"(ig3,g3)";AT 5,15; FLASH
 1; BRIGHT 0;"(g3,ig3)": PLOT 12
6,25: DRAW 0,80: DRAW -85,20: PL
OT 130,25: DRAW 0,80: DRAW 85,20
: RETURN
 803 FOR f=3 TO 9: PRINT AT f,20
+f;"+": NEXT f: LET b=15: FOR f=
13 TO 130 STEP 25: PLOT 245+RND*
9,f: NEXT f: PLOT 50,140: DRAW 1
0,-5: PLOT 60,40: DRAW 10,5: FOR
 f=80 TO 45 STEP -5: PLOT b,f: L
ET b=b-1: NEXT f: RETURN
 804 PLOT 230,50: DRAW 2,0: PLOT
 225,5: DRAW 13,0: PLOT 78,48: D
RAW 5,0: PLOT 52+RND*7,83: DRAW
 4,0: PLOT 1+RND*8,30: DRAW 0,40:
 PLOT 1+RND*10,100: DRAW 0,40: R
ETURN
 899 STOP
 900 LET co=co+1
 901 BEEP 0.1/2,-10
 902 FOR f=0 TO 40: BORDER RND*6
+1: BORDER 0: NEXT f
 903 BORDER 2
 904 GO SUB 200
 908 PRINT AT FN p(y),FN o(x); P
APER 0; INK 6;"(sp)"
 909 IF co=6 THEN  GO TO 9900
 910 RETURN
 999 REM ******JUMP LEFT*******
1000 FOR f=0 TO 29: IF fi=1 AND
y>170 THEN  GO TO 700
1001 IF f<15 THEN  LET x=x-1: LE
T y=y+1: LET shape=152
1002 IF f>14 AND f<20 THEN  LET
x=x-1: LET shape=149
1003 IF f>19 AND f<27 THEN  LET
x=x-1: LET y=y-1: LET shape=147
1004 IF x<1 THEN  LET x=x+1
1005 RANDOMIZE x AND y=shape+USR
 64500
1006 BEEP .01,60
1009 RANDOMIZE x AND y=shape+USR
 64500
1050 NEXT f
1051 LET shape=144
1060 LET m=m+1
1100 GO TO 480
```

continued on page 82

continued from page 81

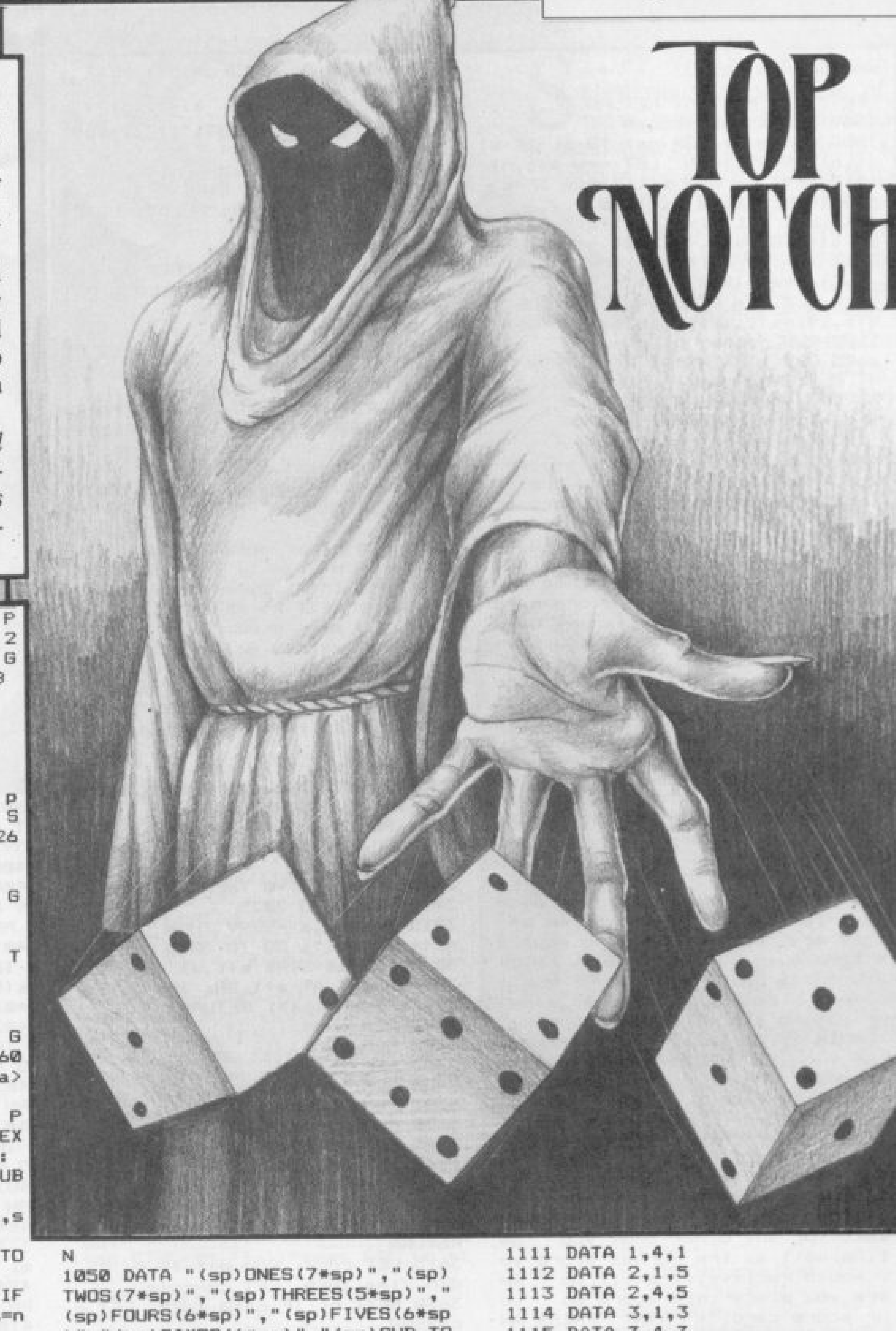
```
1499 REM ******JUMP UP*********
1500 FOR y=y TO y+15
1501 IF fi=1 AND y>170 THEN  GO
TO 700
1504 RANDOMIZE x AND y=shape+USR
 64500
1505 BEEP .01,10
1506 RANDOMIZE x AND y=shape+USR
 64500
1507 NEXT y
1508 LET m=m+1
1510 GO TO 480
1999 REM ******JUMP RIGHT*******
2000 FOR f=0 TO 29
2001 IF fi=1 AND y>170 THEN  GO
TO 700
2002 IF f<15 THEN  LET x=x+1: LE
T y=y+1: LET shape=151
2003 IF f>14 AND f<20 THEN  LET
x=x+1: LET shape=150
2004 IF f>19 AND f<27 THEN  LET
x=x+1: LET y=y-1: LET shape=148
2005 IF x>248 THEN  LET x=x-1
2006 RANDOMIZE x AND y=shape+USR
 64500
2008 BEEP .01,60
2010 RANDOMIZE x AND y=shape+USR
 64500
2050 NEXT f
2051 LET shape=144
2052 LET m=m+1
2053 GO TO 480
3500 REM **DEFINE KEYS********
3501 CLS : RESTORE 3600: READ nk
3502 PRINT "USER DEFINED KEYS";'
'"SELECT NOW": LET m$=""
3503 LET f=4: FOR i=1 TO nk
3504 LET m$=m$+CHR$ 0
3505 READ d$
3507 PRINT AT f,0;d$
3508 PRINT AT f,LEN d$+1; FLASH
1;"?";CHR$ 8;
3509 LET f=f+2
3511 PAUSE 1: PAUSE 0
3512 LET k$=INKEY$
3513 LET sel=0
3514 FOR j=1 TO LEN m$
3515 IF m$(j)=k$ THEN  LET sel=1
3516 NEXT j
3517 IF sel THEN  GO TO 3700
3518 LET m$(i)=k$
3519 PRINT k$
3520 NEXT i
3521 PRINT #1;"PRESS ANY KEY TO
RETURN TO MENU"
3522 PAUSE 0
3523 GO TO 12
3600 DATA 5,"LEFT","RIGHT","JUMP
 UP","JUMP LEFT","JUMP RIGHT"
3650 DATA "LEFT","RIGHT","JUMP U
P","JUMP LEFT","JUMP RIGHT"
3699 STOP
3700 PRINT AT 21,0;"KEY ALREADY
DEFIND"
3701 FOR f=0 TO 100: NEXT f: CLS
 : GO TO 3500
4999 REM *****SCREEN DATA******
5000 DATA 17,5,15,22,6,24,7,28,8
,23,10,2,9,4,18,30,16,30,3,5,3,2
,21,0,21,4,20,6,10,10,10,20,11,2
2,12,24,14,25,9,17,8,15,14,30,3,
10,4,13,15,5,10,2,17,20,15,17,13
,25,20,0,20,18,14,18,6,29,2,2,24
5,16,405
5001 DATA 17,10,13,3,15,4,17,4,1
9,5,8,3,6,0,6,3,6,6,6,9,5,14,7,1
2,21,0,3,30,5,30,7,30,10,5,11,7,
12,9,13,11,14,13,15,16,19,16,17,
21,15,25,17,24,13,25,8,16,20,1,2
0,26,13,17,15,11,5,7,16,21,120,1
46,485
5002 DATA 11,2,11,28,13,30,13,26
,13,22,13,0,13,4,13,8,21,0,21,3,
21,6,21,9,21,12,20,15,21,18,21,2
1,21,24,21,27,21,30,4,0,4,4,4,8,
4,30,4,26,4,22,6,2,6,28,3,15,17,
30,2,15,4,15,2,22,9,2,9,29,8,15,
350
5003 DATA 10,0,10,4,8,7,3,0,3,4,
5,9,7,12,9,15,11,15,13,12,15,9,1
7,4,17,0,19,0,21,0,21,4,21,8,21,
12,21,16,21,20,21,24,21,27,21,30
,18,30,15,30,12,30,9,30,6,30,9,0
,9,5,7,8,7,29,14,10,1,22,5,160,3
65
5004 DATA 3,0,4,4,5,8,6,12,7,16,
8,20,9,24,10,28,11,30,19,28,13,2
4,14,20,15,16,16,12,17,8,18,4,19
,0,21,0,21,5,21,10,21,15,21,20,2
1,25,21,30,10,10,12,10,11,0,11,4
,10,0,14,9,8,11,8,29,17,28,14,28
,8,165,290
6998 REM **********************
6999 REM *******DROPING********
7000 LET y=y-1: LET d=d+1: IF d>
15 OR y<7 THEN  GO TO 8000
7001 RANDOMIZE x AND y=shape+USR
 64500
7002 BEEP .01,45
7003 RANDOMIZE x AND y=shape+USR
 64500
7004 IF ATTR (FN p(y),FN o(x))>1
92 AND fi=0 THEN  LET d=-4: GO S
UB 900
7005 GO TO 400
7799 REM ***********************
***MACHINE CODE FOR SCROLLING***
***SCREEN LEFT******************
********************************
7800 RESTORE 7900: FOR f=64300 T
O 64320
7802 READ a: POKE f,a
7850 NEXT f
7861 RESTORE 7901: FOR f=64350 T
O 64372
7862 READ a: POKE f,a
7865 NEXT f: RETURN
7900 DATA 33,0,64,85,62,192,6,31
,35,94,43,115,35,16,249,114,35,6
1,32,242,201
7901 DATA 33,0,88,58,0,91,14,24,
6,31,35,94,43,115,35,16,249,119,
35,13,32,242,201
7999 REM ****HIGH DROP*********
8000 FOR f=0 TO 100: LET y=y-1
8001 IF POINT (x+5,y-8)=1 OR POI
NT (x+1,y-8)=1 OR y<7 THEN  GO T
O 8100
8003 RANDOMIZE x AND y=shape+USR
 64500
8004 BEEP .01,10
8005 RANDOMIZE x AND y=shape+USR
 64500
8010 IF ATTR (FN p(y),FN o(x))>1
92 THEN  GO SUB 900
8050 NEXT f
8099 REM ****LOSE A MAN********
8100 LET me=me-1: LET y=y1: LET
x=x1: LET d=0
8101 BEEP .525/3,3: BEEP .525/3,
3: BEEP .1125/3,3: BEEP .373/3,3
: BEEP .1125/3,3: BEEP .375/3,3:
 BEEP .3/3,6: BEEP .3/3,5: BEEP
.3/3,3: BEEP .375/3,3: BEEP .112
5/3,3: BEEP .375/3,3
8103 IF me<1 THEN  BEEP 1,1: FOR
 f=0 TO 23: INK 0: RANDOMIZE USR
 3582: NEXT f: INK 6: CLS : GO T
O 8450
8105 GO TO 350
8200 REM ******GAME-OVER******
8450 LET sc=sh*250+co*100-m/11:
LET sc=INT sc
8498 BEEP 01,10: LET d$="NOT A B
AD SCORE"
8499 IF sc>499 AND sc<1000 THEN
 LET d$="AVERAGE"
8500 IF sc>0 AND sc<499 THEN  LE
T d$="POOR"
8501 IF sc>999 THEN  LET d$="OUT
STANDING"
8502 LET f$="PARTS": IF co=1 THE
N  LET f$="PART"
8503 PRINT  INK 6;"GAME OVER"; I
NK 4;''"YOU HAVE MANAGED TO COLL
ECT ";co;"(3*sp)";f$;" OF THE SE
CRET CODE IN      SCREEN ";sh
8504 PRINT "YOU HAVE A SCORE OF
";sc: PRINT "OVERALL RATING "; I
NK 7;d$: PRINT : GO SUB 104
8506 LET pp=1: LET m=0
8507 FOR f=0 TO 50: NEXT f
8508 PRINT AT 21,0; INK 5;"PRESS
 ANY KEY TO PLAY AGAIN"
8509 FOR f=0 TO 20: NEXT f
8510 IF INKEY$="" THEN  GO TO 85
10
8598 GO TO 5
8599 STOP
9500 PRINT "DO YOU WISH TO CARRY
 ON FROM A  PREVIOUS GAME Y/N."
9501 IF INKEY$="y" THEN  GO TO 9
600
9502 IF INKEY$="n" THEN  CLS : R
ETURN
9503 GO TO 9501
9600 CLS : LET u=0
9601 PRINT AT 20,0;"PLEASE ENTER
 SCREEN NUMBER"
9602 INPUT "SCREEN NUMBER :";s$
9603 LET u=CODE s$
9604 IF u<49 OR u>57 OR LEN s$>2
 OR VAL s$>qe THEN  GO TO 9601
9605 LET s=VAL s$: LET sh=s
9606 CLS
9607 PRINT AT 20,0;"PLEASE ENTER
 SCORE"
9608 INPUT "SCORE :";r$
9610 LET ma=CODE r$
9611 IF ma<49 OR ma>57 OR LEN r$
>5 THEN  GO TO 9607
9612 LET r=VAL r$: LET sc=r
9614 CLS
9616 PRINT AT 20,0;"PLEASE ENTER
 AMOUNT OF MEN"
9617 INPUT "ENTER AMOUNT OF MEN
:";v$: IF VAL v$=4 AND sc<1000 T
HEN  GO TO 9616
9618 LET j=CODE v$: IF j<49 OR j
>52 THEN  GO TO 9616
9619 LET me=VAL v$
9620 CLS : RETURN
9700 STOP
9989 REM *ALL CODES COLLECTED**
9990 PRINT AT 0,21; INK 6; PAPER
 2; FLASH 1;"JJJ OUT JJJ"
9995 BEEP .5,-10
9997 LET fi=1
9999 GO TO 400
```

Listing 2

```
  10 REM code loader
  20 CLEAR 64499
  30 FOR x=64500  TO 64619
  40  READ a: POKE x,a
  50 NEXT x
  60 PRINT "Prepare tape to save
 code. The  code should be saved
 just after the main listing."
  70 SAVE "dcode"CODE 64500,119
  80 STOP
 100 DATA 42,101,92,229,235,42,9
9,92,1,15,0,9,237,82,40,2,207,25
 110 DATA 205,162,45,254,128,56,
11,71,214,144,56,19,237,91,123
 120 DATA 92,24,4,237,91,54,92,3
8,0,111,41,41,41,25,24,6,205,56
 130 DATA 11,33,146,92,229,221,2
25,205,162,45,103,229,205,162,45
 140 DATA 225,111,229,14,8,225,3
7,229,36,197,68,77,205,170,34
 150 DATA 193,71,175,176,221,126
,0,40,17,235,38,0,111,62,8,144
 160 DATA 71,41,16,253,235,126,1
70,119,35,123,174,119,221,35,13
 170 DATA 32,213,225,225,34,101,
92,201
```



TOP NOTCH



ROLL 'DEM BONES, stranger, in a crisp version of the traditional dice game Yahtzee. Written for the 48K Spectrum by Steve Movatt of Leigh-on-Sea, Essex, **Top Notch** can be played by 1-6 players.

16K Spectrum owners will find the game fits their machine if they leave out the instructions and REM statements. Remember to put a RETURN command in place of the instructions.

Top Notch *uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before typing in the program.*

```
  10 RANDOMIZE : POKE 23658,8: P
APER 4: BORDER 1: CLS : GO SUB 2
200: GO SUB 2000: GO SUB 1700: G
O SUB 1900: GO SUB 1950: GO SUB
2300
  20 GO SUB 1600
  30 GO SUB 1800: GO SUB 2700
  35 GO SUB 1000
  39 REM main loop
  40 FOR g=1 TO 13: FOR t=1 TO p
: GO SUB 2800: GO SUB 2100: GO S
UB 1400: FOR c=1 TO 3: GO SUB 26
00: GO SUB 2450: GO SUB 2500
  45 IF c=3 THEN  GO TO 110
  50 GO SUB 1300: IF a=6 THEN  G
O TO 50
  60 IF a=32 THEN  GO TO 100
  70 IF a=13 THEN  LET c=3: GO T
O 110
  80 GO SUB 2400: GO TO 50
 100 GO SUB 2460: NEXT c
 110 GO SUB 2500: GO SUB 2460: G
O SUB 2470: INPUT a: GO SUB 2460
: IF a>13 OR a<1 OR s(t,a+(3*(a>
6)))<>0 THEN  GO TO 110
 120 GO SUB 3000: GO SUB 2480: P
AUSE 0: GO SUB 2460: NEXT t: NEX
T g: FOR t=1 TO p: GO SUB 1500:
GO SUB 2800: GO SUB 2100: GO SUB
 1400: PAUSE 300: NEXT t
 125 FOR n=1 TO p: PRINT n$(n),s
(n,19): NEXT n
 130 IF p=1 THEN  LET s=1: GO TO
 150
 140 LET s=1: FOR n=1 TO p-1: IF
 s(n,19)<s(n+1,19) THEN  LET s=n
+1
 145 NEXT n: PRINT "THE WINNER I
S ";n$(s)
 150 IF s(s,19)>VAL h$(1) THEN
LET h$(1)=STR$ s(s,19): LET h$(2
)=n$(s)
 160 PRINT "THE HIGH SCORE OF ";
h$(1): PRINT "IS HELD BY ";h$(2)
: PRINT "ANOTHER GAME"
 170 IF INKEY$="N" THEN  GO TO 9
999
 180 IF INKEY$<>"Y" THEN  GO TO
170
 190 GO SUB 1800: GO TO 35
1000 REM print card
1005 CLS : RESTORE 1050: FOR n=2
 TO 20: READ z$: PRINT  PAPER 7;
AT n,14;z$: NEXT n: RESTORE 1060
: FOR N=2 TO 20: READ Z$: PRINT
 PAPER 5;AT n,26;z$: NEXT n: RES
TORE 1070: FOR n=2 TO 20: READ z
$: PRINT  PAPER 6;AT n,12;z$: NE
XT n: FOR n=2 TO 20: PRINT  PAPE
R 7;AT n,28;"(3*sp)": NEXT n: RE
STORE 1080: FOR n=1 TO 5: READ w
,x,y,z: PLOT w,x: DRAW y,z: NEXT
 n: FOR n=160 TO 8 STEP -8: PLOT
 96,n: DRAW 152,0: NEXT n: RETUR
N
1050 DATA "(sp)ONES(7*sp)","(sp)
TWOS(7*sp)","(sp)THREES(5*sp)","
(sp)FOURS(6*sp)","(sp)FIVES(6*sp
)","(sp)SIXES(6*sp)","(sp)SUB TO
TAL(2*sp)","(sp)BONUS(6*sp)","(s
p)TOTAL(6*sp)","(sp)TRIO(*sp)","
(sp)QUAD(7*sp)","(sp)FULL HOUSE(
sp)","(sp)MINOR RUN(2*sp)","(sp)
MAJOR RUN(2*sp)","(sp)POT LUCK(3
*sp)","(sp)TOP NOTCH(2*sp)","(sp
)SUB TOTAL(2*sp)","(sp)TOP TOTAL
(2*sp)","(sp)GRAND TOTAL"
1060 DATA "*1","*2","*3","*4","*
5","*6","(2*sp)","50","(2*sp)","
FV","FV","25","35","45","FV","50
","(2*sp)","(2*sp)","(2*sp)"
1070 DATA "(sp)1","(sp)2","(sp)3
","(sp)4","(sp)5","(sp)6","(2*sp
)","(2*sp)","(2*sp)","(sp)7","(s
p)8","(sp)9","10","11","12","13"
,"(2*sp)","(2*sp)","(2*sp)"
1080 DATA 96,160,0,-152,112,160,
0,-152,208,160,0,-152,224,160,0,
-152,248,160,0,-152
1100 REM print dice
1105 FOR n=1 TO 5: RESTORE 1110+
d(n,2): READ x,y,z: PRINT  BRIGH
T 1; PAPER 7; INK 2;AT n*5-(n+3)
,1;g$(x);AT n*5-(n+2),1;g$(y);AT
 n*5-(n+1),1;g$(z): NEXT n: RETU
RN
1111 DATA 1,4,1
1112 DATA 2,1,5
1113 DATA 2,4,5
1114 DATA 3,1,3
1115 DATA 3,4,3
1116 DATA 3,3,3
1200 REM choose dice
1205 FOR n=1 TO 5: IF d(n,1)=0 T
HEN  NEXT n: RETURN
1210 LET d(n,2)=ABS (-1*(INT ((R
ND+.55)*5.5)-2)): NEXT n: RETURN

1300 REM keypress
1305 IF INKEY$<>"" THEN  GO TO 1
305
1310 LET a=CODE INKEY$: IF (a<49
 AND a<>32 AND a<>13) OR a>54 TH
EN  GO TO 1310
1315 IF a<>13 AND a<>32 THEN  LE
T a=a-48: BEEP .05,25: RETURN
1320 BEEP .05,25: BEEP .05,25: R
ETURN
1400 REM print score
1405 FOR n=1 TO 19: IF s(t,n)=0
THEN  LET a$="(3*sp)": GO TO 142
0
1410 IF s(t,n)=9999 THEN  LET a$
="(sp)-(sp)": GO TO 1420
1415 LET a$=STR$ s(t,n)
1420 PRINT  OVER 1;AT n+1,28; PA
```

continued on page 84

continued from page 83

```
PER 7;a$: NEXT n: RETURN
1500 REM total scores
1505 LET s=0: FOR n=1 TO 6: IF s
(t,n)<>9999 THEN  LET s=s+s(t,n)
1510 NEXT n: LET s(t,7)=s: IF s>
=62 THEN  LET s(t,8)=50
1515 LET s(t,9)=s(t,7)+s(t,8): L
ET s(t,18)=s(t,9): LET s=0: FOR
n=10 TO 16: IF s(t,n)<>9999 THEN
  LET s=s+s(t,n)
1520 NEXT n: LET s(t,17)=s: LET
s(t,19)=s(t,17)+s(t,18): RETURN
1600 REM number of players
1605 CLS : PRINT AT 21,0;"HOW MA
NY PLAYERS? (max 6)": GO SUB 130
0: IF a>6 THEN  GO TO 1600
1610 CLS : LET p=a: RETURN
1700 REM print rules
1705 CLS : PRINT "  This a game
for 1 to six       players.The ob
ject is to obtain the highest sc
ore you cann from three throws o
f one or all of   the dice.To ho
ld a die press itscorrosponding
number and to       throw them pre
ss space.        The score card
 shows a number ofdifferent ways
 in which you can score and when
 prompted you       enter the numb
er corrosponding  with the metho
d desired."
1710 PRINT "  You do not have to
 take all     three throws and if
you wish to score before your th
ird throw    press enter.": PRINT
 "PRESS ANY KEY  TO   CONTINUE "
1715 PAUSE 0: CLS : PRINT "  One
s,twos etc score number of dice
correctly thrown by the     value
 of it.": PRINT "  A trio scores
 the face value  of all the dice
 providing at      least three of
them are the sameThe same applie
s to a quad but  four must be th
e same.": PRINT "  A minor run i
s four dice in    order and a maj
or run is all     five in order."
: PRINT "  A full house consists
 of two  of a kind and three of
a kind.": PRINT "  Pot luck is s
imply the face    value of all th
e dice."
1720 PRINT "PRESS ANY KEY TO CON
TINUE": PAUSE 0: CLS : PRINT "
A top notch is all five dice   th
e same.You get 50 points for   th
e first one of these but a 100po
ints for any other ones you    ge
t.As well as the normal score yo
u would recieve,if any,from    wh
ere you place this score on    yo
ur score card.": PRINT "PRESS AN
Y KEY TO START": PAUSE 0: RETURN

1800 REM define player arrays
1805 DIM s(p,19): DIM n$(p,10):
RETURN
1900 REM define dice array
1905 DIM d(5,2): RETURN
1950 REM set dice
1955 FOR n=1 TO 5: LET d(n,1)=1:
 LET d(n,2)=n: NEXT n: RETURN
2000 REM define high score array
s
2005 DIM h$(2,10): LET h$(1)="0"
: RETURN
2100 REM clear score panels
2105 FOR n=2 TO 20: PRINT AT n,2
8; PAPER 7;"A_": NEXT n: RETURN

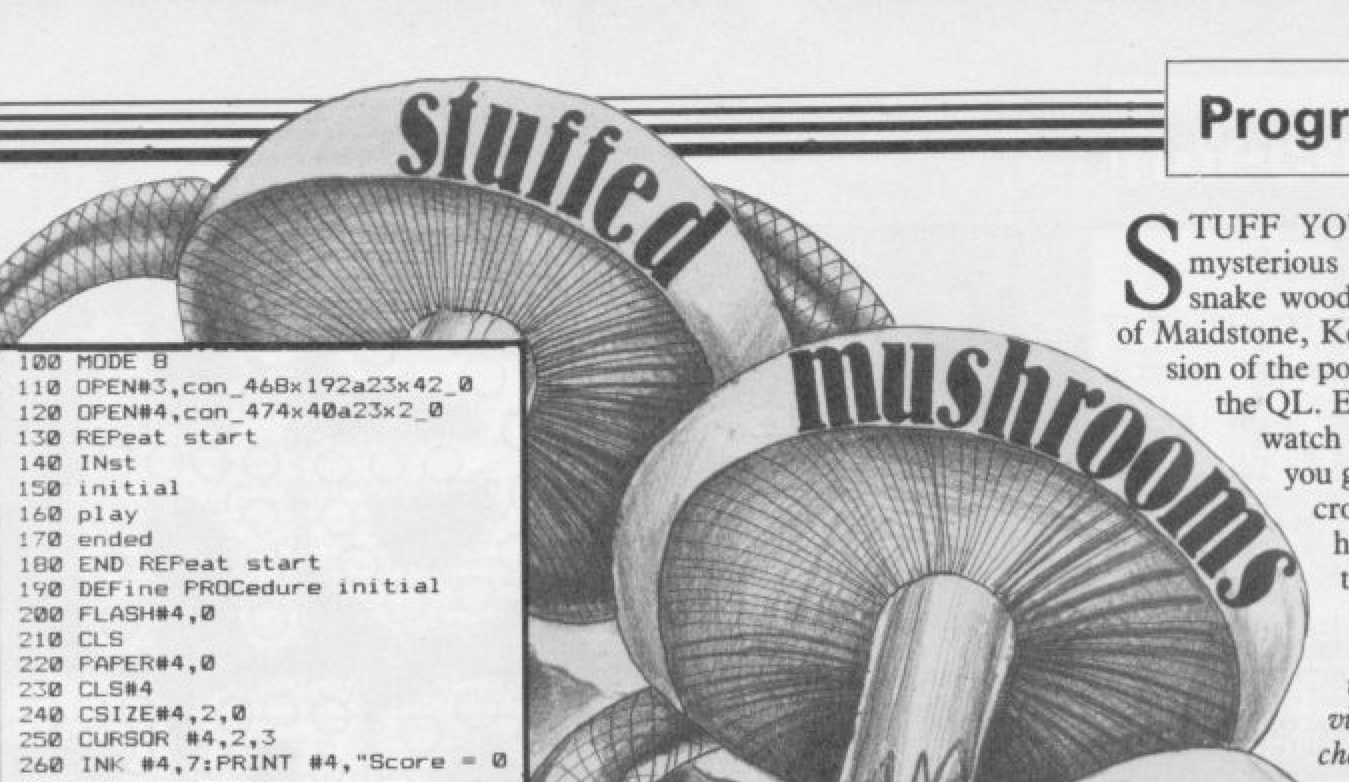
2200 REM define udgs
2205 RESTORE 2210: FOR n=0 TO 23
: READ z: POKE USR CHR$ 144+n,z:
 NEXT n: RETURN
2210 DATA 128,128,128,128,128,12
8,128,255,1,1,1,1,1,1,1,255,255,
231,195,129,129,195,231,255
2300 REM define dice graphis
2310 DIM g$(5,3): RESTORE 2320:
FOR n=1 TO 5: READ g$(n): NEXT n
: RETURN
2320 DATA "(3*ig8)","(2*ig8)C","
C(ig8)C","(ig8)C(ig8)","C(2*ig8)
"
2400 REM print hold
2405 PRINT  PAPER 0; INK 7; FLAS
H 1;AT a*5-(a+2),5;"HELD": LET d
(a,1)=0: RETURN
2450 REM choose dice
2455 PRINT AT 21,0; PAPER 7; INK
 0;"CHOOSE DICE TO BE HELD": RET
URN
2460 REM print out line 21
2465 PRINT AT 21,0;"(32*sp)": RE
TURN
2470 REM choose score
2475 PRINT AT 21,0; INK 0; PAPER
 7;"CHOOSE SCORE (1-13)": RETURN

2480 REM print next player
2485 PRINT AT 21,0; INK 0; PAPER
 7;"NEXT PLAYER PRESS ANY KEY":
RETURN
2500 REM clear hold
2505 FOR n=1 TO 5: PRINT  PAPER
4;AT n*5-(n+2),5;"(4*sp)": LET d
(n,1)=1: NEXT n: RETURN
2600 REM spin dice
2605 FOR a=1 TO 8: GO SUB 1200:
GO SUB 1100: NEXT a: RETURN
2700 REM state players names
2705 FOR n=1 TO p: INPUT "ENTER
PLAYER ";(n);n$(n): NEXT n: RETU
RN
2800 REM print in name
2805 PRINT AT 0,12; PAPER 3; INK
 7;n$(t): RETURN
3000 REM calculate scores
3005 GO SUB 3000+(a*100): GO SUB
 3010: RETURN
3010 IF s(t,a)=0 THEN  LET a$="(
3*sp)": GO TO 3025
3015 IF s(t,a)=9999 THEN  LET a$
="(sp)-(sp)": GO TO 3025
3020 LET a$=STR$ s(t,a)
3025 PRINT AT a+1,28; INK 0; PAP
ER 7; OVER 1;a$: RETURN
3100 REM ones
3200 REM twos
3300 REM threes
3400 REM fours
3500 REM fives
3600 REM sixes
3605 GO SUB 5000: IF co=5 AND s(
t,16)=50 AND d(1,2)=a THEN  LET
s(t,a)=co*a+100: RETURN
3610 IF co=5 AND s(t,16)=50 AND
d(1,2)<>a THEN  LET s(t,a)=100:
RETURN
3615 LET co=0: FOR n=1 TO 5: IF
d(n,2)=a THEN  LET co=co+a
3620 NEXT n: IF co=0 THEN  LET c
o=9999
3625 LET s(t,a)=co: RETURN
3700 REM trio
3800 REM quad
3805 LET a=a+3: LET s=0: FOR n=1
 TO 5: LET s=d(n,2)+s: NEXT n: G
O SUB 5000: IF co=5 AND s(t,16)=
50 THEN  LET s(t,a)=s+100: RETUR
N
3810 FOR n=1 TO 3-(a=11): LET co
=1: FOR m=n+1 TO 5: IF d(n,2)=d(
m,2) THEN  LET co=co+1
3815 NEXT m: IF co>=3+(a=8) THEN
  LET s(t,a)=s: RETURN
3820 NEXT n: LET s(t,a)=9999: RE
TURN
3900 REM full house
3905 LET a=a+3: GO SUB 5000: IF
co=5 AND s(t,16)=50 THEN  LET s(
t,a)=125: RETURN
3910 IF co=5 THEN  LET s(t,a)=25
: RETURN
3915 IF co<2 OR c>3 THEN  LET s(
t,a)=9999: RETURN
3920 FOR n=2 TO 5: IF d(1,2)=d(n
,2) THEN  NEXT n
3925 LET s=1: FOR m=n+1 TO 5: IF
 d(n,2)=d(m,2) THEN  LET s=s+1
```



```
3930 NEXT m: IF s+co<>5 THEN  LE
T s(t,a)=9999: RETURN
3935 LET s(t,a)=25: RETURN
4000 REM minor run
4005 GO SUB 4100: IF (s(t,a)=999
9 AND co>=3) OR s(t,a)=100 THEN
 RETURN
4010 FOR n=3 TO 4: FOR m=1 TO 5:
 IF d(m,2)<>n THEN  NEXT m: LET
s(t,a)=9999: RETURN
4015 NEXT n
4020 FOR n=1 TO 2: FOR m=1 TO 5:
 IF d(m,2)<>n THEN  NEXT m: GO T
O 4030
4025 NEXT n: LET s(t,a)=35: RETU
RN
4030 FOR n=5 TO 6: FOR m=1 TO 5:
 IF d(m,2)<>n THEN  NEXT m: GO T
O 4040
4035 NEXT n: LET s(t,a)=35: RETU
RN
4040 FOR n=2 TO 5 STEP 3: FOR m=
1 TO 5: IF d(m,2)<>n THEN  NEXT
m: LET s(t,a)=9999: RETURN
4045 NEXT n: LET s(t,a)=35: RETU
RN
4100 REM major run
4105 LET a=a+3: GO SUB 5000: IF
co=5 AND s(t,16)=50 THEN  LET s(
t,a)=100: RETURN
4110 IF co>=2 THEN  LET s(t,a)=9
999: RETURN
4115 LET s=0: FOR n=2 TO 5: FOR
m=1 TO 5: LET s=s+1*(d(m,2)=1 OR
 d(m,2)=6): IF d(m,2)<>n THEN  N
EXT m: LET s(t,a)=9999
4120 NEXT n: IF s<>0 THEN  LET s
(t,a)=45: RETURN
4125 LET s(t,a)=9999: RETURN
4200 REM pot luck
4205 LET a=a+3: LET s=0: FOR n=1
 TO 5: LET s=s+d(n,2): NEXT n: G
O SUB 5000: IF co=5 AND s(t,16)=
50 THEN  LET s(t,a)=100+s: RETUR
N
4210 LET s(t,a)=s: RETURN
4300 REM top notch
4305 LET a=a+3: GO SUB 5000: IF
co=5 AND s(t,a)=0 THEN  LET s(t,
a)=50: RETURN
4310 LET s(t,a)=9999: RETURN
5005 LET co=1: FOR n=2 TO 5: IF
d(n,2)=d(1,2) THEN  LET co=co+1
5010 NEXT n: RETURN
```

Stuffed mushrooms



STUFF YOUR FACE with the mysterious mushrooms of the snake woods. Graham Calladine of Maidstone, Kent has written a version of the popular Snake game for the QL. Eat the mushrooms but watch out – as you gobble you grow, and you mustn't cross your own tail. At higher levels you have to eat the mushroom spores instead.

Stuffed Mushrooms *uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before entering the program.*

```
100 MODE 8
110 OPEN#3,con_468x192a23x42_0
120 OPEN#4,con_474x40a23x2_0
130 REPeat start
140 INst
150 initial
160 play
170 ended
180 END REPeat start
190 DEFine PROCedure initial
200 FLASH#4,0
210 CLS
220 PAPER#4,0
230 CLS#4
240 CSIZE#4,2,0
250 CURSOR #4,2,3
260 INK #4,7:PRINT #4,"Score = 0
"
270 INK #3,7
280 PAPER #3,0
290 CLS#3
300 BORDER #3,1,6
310 h=18:w=37
320 q=RESPR(0):IF q>262000 THEN
q=RESPR(700)
330 FOR a=q TO q+700 STEP 4
340 POKE_L a,0
350 END FOR a
360 AT#4,2,0:INPUT#4,"SKILL LEVE
L 1-5?";LE
370 IF LE<1 OR LE>5 THEN GO TO 3
60
380 AT#4,2,0:PRINT#4,"Press any
key to start"
390 PAUSE
400 sc=0
410 f=0
420 CC=190
430 SELect ON LE
440 =1: n=50
450 =2:n=80
460 =3:n=110
470 =4:n=130
480 =5:n=155:CC=46
490 END SELect
500 IF CC<>46 THEN CC=190
510 FOR a=1 TO n
520 REPeat d
530 b=RND(0 TO h):c=RND(0 TO w)
540 IF b=10 AND c=21 THEN NEXT d
550 IF NOT PEEK (q+b*(w+1)+c) TH
EN EXIT d
560 END REPeat d
570 POKE q+b*(w+1)+c,1
580 AT #3,b,c:PRINT #3,CHR$(CC)
590 INK#3, RND(1 TO 7)
600 END FOR a
610 BEEP 15000,4,12,40,1
620 INK #3,6,2
630 l=8:r=16:lc=1:rc=0:d=191
640 AT #3,l,r:PRINT #3,CHR$(d)
650 POKE q+l*(w+1)+r,2
660 DIM p$(220)
670 p$=CHR$(l)&CHR$(r)
680 END DEFine
690 DEFine PROCedure snake(i)
700 INK #3,6,2
710 IF KEYROW(3)&&8 THEN f=1:RET
urn
720 SELect ON i
730 =2:IF d<>189 THEN lc=0:rc=-1
:d=188
740 =16:IF d<>188 THEN lc=0:rc=1
:d=189
750 =4:IF d<>191 THEN lc=-1:rc=0
:d=190
760 =128:IF d<>190 THEN lc=1:rc=
0:d=191
770 END SELect
780 lf=l:rf=r:p=LEN(p$)
790 l=l+lc:r=r+rc
800 IF l>h OR r>w OR l<0 OR r<0
THEN
810 f=1:AT #3,lf,rf:PRINT #3,CHR
$(d):RETurn
820 END IF
830 IF p=2 THEN
840 AT #3,lf,rf:PRINT #3,CHR$(32
)
850 ELSE
860 AT #3,lf,rf:PRINT #3,CHR$(79
)
870 END IF
880 AT#3,l,r:PRINT #3,CHR$(d)
890 v=PEEK(q+l*(w+1)+r)
900 POKE q+l*(w+1)+r,2
910 p$=p$&CHR$(l)&CHR$(r)
920 SELect ON v
930 =0:la=CODE(p$(1))
940 ra=CODE(p$(2))
950 AT #3,la,ra:PRINT #3,CHR$(32
)
960 POKE q+la*(w+1)+ra,0
970 p$=p$(3 TO LEN(p$))
980 =1:sc=sc+1
990 BEEP 1000,10,40,100,10
1000 CURSOR #4,98,3:PRINT #4,sc
1010 IF sc=n THEN f=1
1020 =2:f=1
1030 END SELect
1040 END DEFine
1050 DEFine PROCedure play
1060 CURSOR #4,0,20
1080 PRINT #4,"Use keys(2*sp,CTR
L\,2*sp,CTRL],2*sp,CTRL+SHIFT6,2
*sp,CTRL+SHIFT-):Press ESC to st
op."
1090 REPeat g
1100 i=KEYROW(1)
1110 snake i:IF f THEN EXIT g
1120 IF i&&8 THEN end_1
1130 END REPeat g
1140 END DEFine
1150 DEFine PROCedure ended
1160 CURSOR #4,0,20
1170 CLS#4
1180 FLASH #4,1
1190 CSIZE#4,3,1
1200 BEEP 15000,12,40,4,1
1210 IF sc=n THEN
1220 INK#4,3
1230 AT#4,0,8:INK #4,2,6:PRINT #
4,"You WON ";
1240 ELSE
1250 AT#4,0,9:INK #4,6,2:PRINT #
4,"Your DEAD"
1260 END IF
1270 end_1
1280 END DEFine
1290 DEFine PROCedure end_1
1300 CLS#3
1310 CSIZE #4,0,0:CSIZE#3 ,0,0
1320 INK #3,2
1330 INK #3,5:AT#3,8,5:PRINT #3,
"Press Enter to play again  "
1340 INK#3,6:FLASH#3,1:AT#3,2,13
:PRINT#3, "Score ";sc
1350 REPeat s
1360 k=CODE (INKEY$(1000))
1370 IF k=10 THEN CLS #3:CLS #4:
FLASH#3,0:GO TO 150
1380 END REPeat s
1390 END DEFine
1400 DEFine PROCedure INst
1410 WINDOW 512,256,0,0
1420 CLS#3:PAPER 0:CLS
1430 PAPER#2,0:BORDER#2,1,0:INK#
2,7:CLS#2
1440 INK#3,6:UNDER#3, 1:AT#3,1,1
0:PRINT #3,"THE SNAKE":UNDER#3,0
1450 INK#3,5
1460 PRINT#3
1470 PRINT#3,"Your objective in
this game is"
1480 PRINT#3,"to eat all of the
";:INK#3, 2:PRINT#3, "'.' or '(C
TRL+SHIFT6)'";:INK#3, 5:PRINT#3,
 " without "
1490 PRINT#3,"hitting the walls
or your"
1500 PRINT#3,"growing tail.";:IN
K#3,6,2:PRINT#3," 'O'":INK#3,5:P
RINT#3,\"You must all so becaref
ul on level"\"4 or 5 because you
r tail can break up orleave invi
sible mines."\\"Use the cursor k
eys to move."\\"Press any key to
 play."
1510 PAUSE
1520 v=0
1530 FOR v=1 TO 18
1540 SCROLL -10
1550 END FOR v
1560 END DEFine
```

HIGH SCORE

PUT A professional-style high score table into your arcade games with this routine by David Ward of Leicester, which can be used with any Spectrum. The display shows a grid of letters, and you move the cursor around them to select the letters for your name.

The program uses one UDG, character number 145, so you must avoid that in your main program, as well as the variables used. The STOP commands in lines 9657 and 9998 should be changed to RETURN if you want to use the program as a subroutine, and you will have to experiment a little to find out the most suitable place to print the actual score, depending on the requirements of your game.

The program uses our special abbreviations for graphics characters, do please read the instructions on the first page of Program Printout before entering listing.

```
9000 FOR n=0 TO 7
9010 READ a: POKE USR "b"+n,a
9020 NEXT n
9030 DATA 255,129,129,129,129,12
9,129,255
9040 PAPER 0: BORDER 0: INK 7: C
LS
9050 LET c=18: LET d=15: LET x=1
0: LET y=2: LET e=0
9051 PRINT  INK 2;AT 18,9;"NAME:
"
9052 PLOT 119,32: DRAW 81,0: PLO
T 200,32: DRAW 0,-9: PLOT 200,23
: DRAW -81,0: PLOT 119,23: DRAW
0,9
9060 PRINT  INK 2;AT 1,5;"PLEASE
 ENTER YOUR NAME"
9070 PRINT AT 2,0;"Press '8' to
move colour cursor right,'5'for
left,The'break key'to enter a ch
aracter and'0'to delete a charac
ter(10 chracters max)"
9080 FOR i=65 TO 73
9090 PRINT AT 10,y;CHR$ i
9100 LET y=y+3
9110 NEXT i
9120 LET y=2
9130 FOR i=74 TO 82
9140 PRINT AT 12,y;CHR$ i
9150 LET y=y+3
9160 NEXT i
9170 LET y=2
9180 FOR i=83 TO 90
9190 PRINT AT 14,y;CHR$ i
9200 LET y=y+3
9210 NEXT i
9215 LET a=10: LET b=2: LET i=65
9220 PRINT AT 14,26;CHR$ 46
9230 PRINT AT 16,2;CHR$ 145
9235 FOR t=1 TO 30: NEXT t
9240 IF INKEY$="8" THEN   GO TO
9300
9250 IF INKEY$="5" THEN  GO TO 9
510
9260 IF INKEY$="0" THEN  GO TO 9
630
9270 IF INKEY$="(sp)" THEN  GO T
O 9650
9280 PRINT  INK 2;AT a,b;CHR$ i
9290 GO TO 9235
9300 IF b=26 AND a=10 THEN  GO T
O 9340
9310 IF b=26 AND a=12 THEN  GO T
O 9380
9320 IF b=23 AND a=14 THEN  GO T
O 9420
9321 IF b=26 AND a=14 THEN  GO T
O 9450
9323 IF a=16 AND b=2 THEN  GO TO
 9480
9324 PRINT  INK 7;AT a,b;CHR$ i
9325 PRINT  INK 2;AT a,b+3;CHR$
(i+1)
9330 LET b=b+3: LET i=i+1
9337 GO TO 9290
9340 LET b=2: LET a=12: LET i=i+
1
9350 PRINT  INK 7;AT 10,26;CHR$
(i-1)
9360 PRINT  INK 2;AT a,b;CHR$ i
9370 GO TO 9290
9380 LET b=2: LET a=14: LET i=i+
1
9390 PRINT  INK 7;AT 12,26;CHR$
(i-1)
9400 PRINT  INK 2;AT a,b;CHR$ i
9410 GO TO 9290
9420 LET b=26: LET a=14: LET i=4
6
9430 PRINT  INK 7;AT 14,23;CHR$
90
9440 PRINT  INK 2;AT a,b;CHR$ 46
: GO TO 9290
9450 LET b=2: LET a=16: LET i=14
5
9460 PRINT  INK 7;AT 14,26;CHR$
46
9470 PRINT  INK 2;AT a,b;CHR$ i
9475 GO TO 9290
9480 LET b=2: LET a=10: LET i=65
9490 PRINT  INK 7;AT 16,2;CHR$ 1
45
9495 PRINT  INK 2;AT a,b;CHR$ i
9500 GO TO 9290
9510 IF b=2 AND a=10 THEN  GO TO
 9550
9520 IF b=2 AND a=12 THEN  GO TO
 9560
9530 IF b=2 AND a=14 THEN  GO TO
 9590
9540 IF b=2 AND a=16 THEN  GO TO
 9600
9542 IF b=26 AND a=14 THEN  GO T
O 9610
9543 IF b=2 AND a=16 THEN  GO TO
 9690
9545 PRINT  INK 7;AT a,b;CHR$ (i
)
9547 PRINT  INK 2;AT a,b-3;CHR$
(i-1)
9548 LET b=b-3: LET i=i-1:
9549 GO TO 9290
9550 LET a=16: LET b=2: LET i=14
5
9552 PRINT  INK 7;AT 10,2;CHR$ 6
5
9554 PRINT  INK 2;AT a,b;CHR$ i
9556 GO TO 9290
9560 LET b=26: LET a=10: LET i=i
-1
9570 PRINT  INK 7;AT 12,2;CHR$ (
i+1)
9575 PRINT  INK 2;AT a,b;CHR$ i
9580 GO TO 9290
9590 LET b=26: LET a=12: LET i=i
-1
9591 PRINT  INK 7;AT 14,2;CHR$ (
i+1)
9595 PRINT  INK 2;AT a,b;CHR$ i
9597 GO TO 9290
9600 LET a=14: LET b=26: LET i=4
6
9602 PRINT  INK 7;AT 16,2;CHR$ 1
45
9603 PRINT  INK 2;AT 14,26;CHR$
i
9605 GO TO 9290
9610 LET a=14: LET b=23: LET i=9
0
9620 PRINT  INK 7;AT 14,26;CHR$
46
9623 PRINT  INK 2;AT 14,23;CHR$
i
9625 GO TO 9290
9630 LET d=d-1
9632 LET e=e-1
9634 IF d=14  THEN  LET d=15
9635 IF e=-1 THEN  LET e=0
9637 FOR t=1 TO 15: NEXT t
9639 PRINT AT c,d;"(sp)"
9640 GO TO 9290
9650 FOR t=1 TO 15: NEXT t
9654 IF i=145 THEN  PRINT AT c,d
;CHR$ 32 : IF i=145 THEN  GO TO
9657
9655 PRINT AT c,d;CHR$ i
9657 IF e=9 THEN  STOP
9660 LET e=e+1
9670 LET d=d+1
9680 GO TO 9290
9998 PAUSE 20: CLS : STOP
```

POOLSWINNER

THE ULTIMATE POOLS PREDICTION PROGRAM



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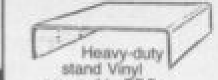
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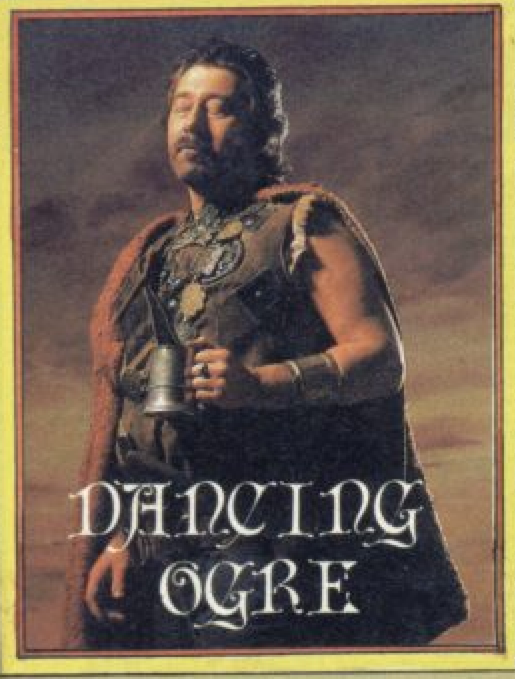
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MICRO INTERFACE

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Gordo's war cry brings comfort to travellers in the bogs of Urunnar

A DANK and fetid mist hung over the swamps as we left Urdnal's road-fort. We rode warily southwards with a small group of other travellers, amongst them a fat merchant, his beard plaited with gold wire, and his daughter clad in ring-mail and red cloak.

Our uneasiness grew as we proceeded. Zul and Zel snuffed at the air with suspicion and jabbered excitedly to each other in their halfling tongue. We rounded a reed-shrouded bend in the road . . . and out from the ditches sprang 10 or 12 scaly green creatures, hissing and snarling. Snake men! And one of them dragged a human on a leash.

The merchant howled in terror and covered his head — but his daughter reached behind her and drew forth a glittering scimitar. Straight at them she rode and they swarmed around her, flint knives hacking. This was enough for me. "Gnaa-Ithukk", roared I and flung my club. Three bog-dwellers fell. The lady with a dainty sword took two as fast as a blink. Zul and Zel grinned wickedly and cast their throwing knives. Four more. The rest fled, gibbering and clicking.

I seized the captive on the leash and hauled him up behind me. The horses were half-dead when we reached the cavalry fort at Uusuun-An, set on the only firm ground for leagues. The names is Maruvian for High Point . . . all of twenty feet at best.

There we were told the road to Urtuun was in turmoil. So we camped early within the walls along with other unfortunate travellers.

Few could sleep and there was much talk around the fires. Old Thumb of West Byfleet told a tale of shrinking when, as the **Microman** *in* **Project X** *he had combat with a massive maddened mole in an underground tunnel. Though armed with a needle as rapier he could not defeat it. Many of us told Thumb he was on the right track — but he needs a shield as well as sword. When so small, a button would serve well for that purpose. Examine fields and foliage well.*

A hard drinking group, most oddly garbed in false beards, bemoaned their failures down in Ketland — **The Final Mission** *had been their downfall. Trekker Topham of Huddersfield pressed me for aid. She had encountered a slime thing in the halls of Vran and fought long and uselessly. She should ignore this demon — it serves nothing to stay. But that was not enough for Trekker. What of the cubby hole near the High Ceilinged room? What use for the garlic?*

Borrowing her haunch of lamb I told her that the cubby hole is useful as a hiding place. If any of you should encounter a 'splatting' noise in the High room than head west and up to the hole. Wait here six times and you should hear a splintering. You may then find a closed door open. The garlic . . . well, all travellers know that to be a specific against the bloodsuckers and flesheaters. The Lady Delphia has just such noisesome eating habits. Garlic in a place of death will stave off her attacks.

Baz Bateman of 66 Foster Drive, Bodmin, Cornwall sought help with **The Hulk**, **Spiderman** *and the many treasures of* **Eureka**. *He knows Middle Earth well and would help others with that in return.*

Eureka *baffles many. Ironman Johnston of 4, Ingleby Terrace, Maryport, Cumbria confessed his failure to find the Golden Eagle standard in this quest — indeed he could not even enter the legions' camp. Let me know, friends, where this Aquila may be for many others seek this knowledge.*

Witchmaster Wood of 22, Denham Way, Denham, Uxbridge UB9 5AX had been badly stumped by the **Lords of Time**. *A skeleton assailed him — invincible or so it seemed. Now, his joints may be loose so hurl a well-aimed rock. That may discourage the abomination.*

Others then with Witchmaster pleaded for advice on the same adventure. Elfstrangler Edwards of Bury found his silver coin would not pay for ale in the Roman town. Think of a landlord's overheads, youngster, for ale is not cheap. A golden nugget should be the asking price — had from a cavewoman in another time. And no, there is no other source of light besides the candle.

Hendrik von Braun of Carson Road, London, stepped up to offer help with **Dragon Torc** *. . . slightly foxed he was and incanted thus. "At henges use a Ley Rod all around and blue cubes to make the spirits bound. If snakes you fear then light a torch and be at peace." With that he vanished into the night, muttering to himself.*

For those who travel wearily in **Tir Na Nog**, *Steve the Sidhe Slayer offered all his help — so long as they pay the courier's fee for him. He had united the four parts of Calum's Seal and activated it with his hammer. Whip your horses on to 13 Porter Close, Clifton Estate, Nottingham, NG11 8QU.*

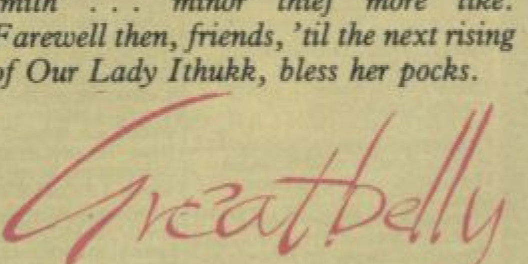
So we came to the serious matter of **Sherlock's** *murder hunt. Wraithbane Ben of Southwick and many others had found that their time runs out at 1.02 am on Tuesday morning.*

Know this, all of you . . . that time is when the miserable and erroneous Lestrade arrests that opium-eater Major Ffoulkes. So then 'offically' the murder has been solved! As I have said before it is best to prove the Major innocent before any other task. If you do so time will not stop in its tracks. Go to Sidmouth Street on Monday evening and follow the addict, suitably disguised of course. The quest should normally end between 6 and 8pm on the Wednesday but may go on for longer, now and then.

Two others, Gregory de Vauclusle of far Australia and 'Bishop' Colin of London also sought this murderer and looked in a stream for a gun which they are sure was there. They could see no purpose in the hedge. First the hedge — it has as much use as a certain crimson fish. The stream's a different matter . . .

First, as before, the major should be proved innocent. Once done, follow Lestrade back to Leatherhead where he too walks beside the stream. Examine all the places thereabouts with care.

As the dawn came up the snake men's captive came to his wits. Iubba of Mazra he said his name was, profession locksmith . . . minor thief more like. Farewell then, friends, 'til the next rising of Our Lady Ithukk, bless her pocks.



Gordo Greatbelly, Landlord

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Programmers Peter Jones and Trevor Levor look forward to their hols

Richard Price dons knotted hanky and samples the low-life of a kwikhol

Don't drink the water

NOW YOUR SUNBURN has begun to fade you've probably started to get your holiday snaps back through the post. The nostalgia wells up as you share the happy memories with immensely bored relatives and friends.

There it all is — the glorious sunsets over the towering concrete hotels, the trendy beaches packed with tassled beach umbrellas, topless bathing belles and stout gentlemen in vests and knotted hankies.

By now you've begun to forget the blistered back and nose, the hours of agony pulling out sea-urchin spines or the two days you spent locked in the loo after indulging yourself in those tempting-looking prawns and several gallons of cheap hooch ("OK! I know it's a bit like turpentine but it's only three pesetas a litre and anyway you don't notice the taste after a bit.")

Never fear, folks — all those memories can now be relived, recalled and resuffered solely with the aid of your trusty micro in **Terrormolinos,** a fearsome and harrowing saga of the average family on the average package tour. Many of those experiences can be photographed and reviewed during the game, courtesy of the miracle of glorious living Saucivision.

EXCLUSIVE

Terrormolinos

Terrormolinos is the creation of Peter Jones and Trevor Levor, co-authors of **Hampstead.** Published by Melbourne House, the game is a Quilled text adventure, but this time features the addition of a graphics system.

Like all good holidays your trip begins with the panic-stricken rush to pack and be ready in time for the taxi to the airport. There you are in your



semi with Beryl upstairs getting ready, little Ken trailing around after you with his thumb in his mouth and Doreen the daughter immured in the bathroom, as permanent a feature as the avocado toilet suite.

The most essential item to remember is the camera, as winning the game is achieved by taking the correct 10



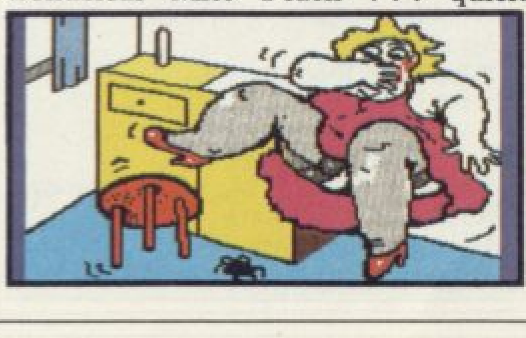
snaps of the trip. You have only one film and every picture will count.

The taxi hoots outside. Ready or not you had better hurry or the driver will get fed up and leave you stranded. Where are the tickets? Have you got the red hanky? Can you remember the name of your hotel? Those and other things are essential for the journey.

Once you are past the initial time-limited section you can settle down in the plane, ignore little Ken who is using the sick bag as a hat and look forward to Terrormolinos, basking in the lethal Mediterranean sun like some ancient reptile ready to devour unwary innocents.

The Hotel Excrucio is a cool haven from the heat but the excitements of foreign climes beckon seductively. There are the gift shops, the beach with its picturesque little island — what are those black triangles nipping through the waves?

Perhaps, you'd like to take an excursion — very cheap — to the bullfight or the wine-tasting. Do your best to avoid Mr Snargsby, the life and soul of the tour group, and mind Beryl doesn't catch you staring at the wonderful Miss Peach . . . quick



where's the camera?

Of course, there are hazards. Don't let the kids bury you in hot sand. Be careful of what you eat and of what may eat you. Avoid being gored by irate fighting bulls and take care in the sun — heatstroke could ruin your holiday.

Every holiday disaster you can imagine will come true in Terrormolinos and when the worst happens your embarrassment and suffering will be shown on screen in Saucivision. Each 'correct' snap or fatal error has been drawn in the form of a seaside postcard — you know, the sort with large ladies and double entendres galore. During the game you can review them at any time and also check how many exposures you have left. The screens illustrated here are taken from the Commodore versions, but give you an idea of what to expect!

If you enjoyed **Hampstead** I have no doubt at all that **Terrormolinos** will be equally if not more appealing. It is not numbingly difficult but its endless sick humour will draw you from disaster to disaster. Even people who hate the usual type of computer adventure will want to join in — it will make a welcome change from *Dallas* and *Coronation Street*. Immensely silly, immense fun!

Red Moon

If the tribulations of the Spanish seaside are just too much, you may decide to immerse yourself in the cool magic of **Red Moon,** Level 9's new graphic adventure.

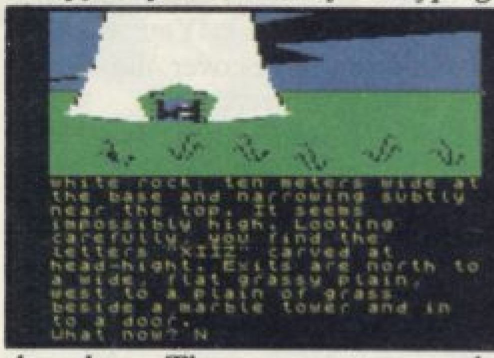
Long ago, when the moon was red, Magik was powerful and all-embracing. Then the moon grew colder and greyer and the arts of darkness became more difficult and obscure. In time, Magik failed and the warlocks and sorcerers met to remedy their loss. They created the Red Moon Crystal and placed it in the Moon Tower in the land of Baskalos. Thus did Baskalos became the centre and heart of Magik and the other arts of civilisation.

One day, though, the Crystal was stolen and Baskalos nearly collapsed into barbarism and chaos. Then a magician came who recovered it and saved his world from fear and eternal darkness . . .

Baskalos is a world of reclusive and dangerous sorcerers who dwell in mist-shrouded castles, unscalable towers or endless networks of caverns beneath the volcano torn landscape. Here were once dragons and may be still and giants beat out runestrong swords in subterranean smithies.

As usual with Level 9 the game is big, with over 200 locations to explore. Many of those have graphic illustrations of the scenes and the descriptions are atmospheric.

The pictures appear relatively fast but will not interfere with your text entry, as you can carry on typing as



they draw. They are pretty enough in that impressionistic style Level 9 has adopted. If they do get in your way you can dispose of them simply by asking for 'Words'.

It's always debatable as to whether the sheer volume of graphics affects the text interpreter and there were occasions when I felt that the Examine function could have been more informative about objects or locations. The detail in the descriptions does balance that, though.

As befits a world where Magik is all, you have the opprtunity of casting up to a dozen different spells to deal with many threatening situations. To cast a particular spell you must be in possession of an object which acts as its focussing point.

If, for instance, you own a certain pearl you can 'Cast Snoop North' to look into a room to your north. A dagger will allow you to 'Cast Zap' and magically attack an enemy, and a dulcimer will help you to teleport to and from the start point, thus escaping some fatal peril.

Combat, also can be undertaken — but make sure you have some sort of weapon and armour first. At the beginning you have 50 'hit points' which will be depleted by battle. Hit points are also used up when you cast spells, so be sparing with Magik and fight only when you really have to. Special objects, such as rune swords, appear to increase your ration of points but they may be costly to acquire.

continued on page 94

continued from page 93

One other cautionary note — iron has always been known as a specific against magic and its presence in a location will reduce or totally nullify the effect of your spell-casting. When I was underground in the lair of Ziix the Magician I found it impossible to cast proper spells despite dropping every iron object I had collected. Are the caverns iron-ore bearing? Only time and yet more effort will tell.

Be sure of one thing; the solution to **Red Moon** is no easy linear progression from task to task. You will have to work hard to discover the significance of many objects.

Red Moon comes at the same price as the earlier **Emerald Isle** which Level 9 claimed was easier than their higher priced adventures. I suppose it all depends what you mean by easy!

Warlord

Continuing in the magical vein we come to **Warlord** a text and graphic game from Interceptor Micros.

The scene is the Celtic upland of Britain in the early Roman period of its history. The imperial legions of the Emperor Vespasian have cut and burned their way up through the land, destroying hillforts and settlements in their progress.

As the red-crested cohorts reach what is now the Scottish border their



advance is stopped by a powerful tribe led by a tough and resourceful warlord — that's you.

Even the gods join in to try and influence the struggle until finally the two sides agree on a form of single combat. By divine means, the warlord and a selected centurion are transported to a Celtic otherworld. The first to travel through time and space back to the 'real' world will be the victor. Strange puzzles and creatures will confront you and the gods themselves may intervene at times.

There are about a hundred locations for your £5.50 although most have very brief descriptions. There are excellent location graphics, some of which show that the author or graphics designer had done some research into the history of the period. I was particularly impressed by the picture of the chieftain's hut in the hill-fort. The pictures are few and far between, though, and the large number of one-line descriptions tend to reduce the atmosphere.

Examining things will bring little result except for important objects. I expected to be able to do more in locations than I was allowed to.

Nevertheless the game has a good feel of its period and the interpreter will allow more than the usual verb/noun combinations — 'throw meat to bear' is allowed, for instance. The vocabulary is rather bereft at times despite that, and it was very odd to find that the program would not understand 'tie' when you have a piece of rope in your hands — I expect a bit more verbal versatility than that.

Warlord, then, is pretty much in the middle ground of adventuring. More detail would have improved on a reasonably interesting plot and setting.

Timesearch

Timesearch from Millenium Software suffers from similar problems and a few more besides. It is a Quilled game, text only, and is set in a ruinous world locked in a 'time bubble' because of a fault in the ultimate weapon — a Time Stabilizer.

Whilst that powerful weapon was being tested a fault developed which hurled all the occupants of the bubble into a time void. You are cast as the sole survivor.

The aim is to locate and de-activate the Stabilizer. To assist you in this task you must locate a Crystal of Mirrors — an object which will allow you to use past events to influence the present and force Time to give away the secrets of the Stabilizer.

I found all this a little incomprehensible at first. Most of the many locations were briefly described as villages or road junctions and very little could be made to happen in them.

The first score or so of moves is governed by the need to find food quickly. Once you have sorted out the rations you will then naturally want to explore a bit. Big problem here: the game turns out to have a move limitation and any extra wandering means that you cannot win.

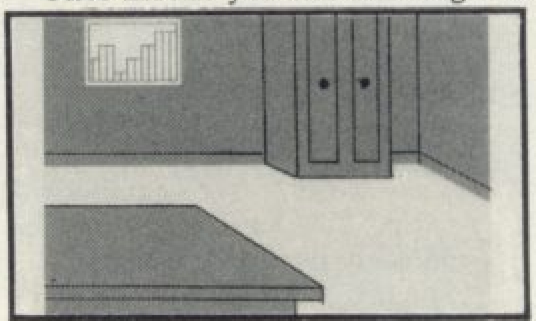
Operation Nightingale

Operation Nightingale from Softly Softly is yet another **Quill** and **Illustrator** package.

This is a spy story set in London. Jameson, your predecessor, has been rubbed out by the hit-men of a drugs syndicate and you are under orders to capture the head of the syndicate. Your *nom de guerre* is Nightingale.

The action covers London, the suburbs and other parts of the country. You must first raise cash to buy a travel pass to get around town.

Once mobile you can then begin to



hunt for the syndicate. There are secret safes, planes you can fly, odd little shops where you can buy things like vests and overalls, with a few location graphics.

The story-line is not particularly original but the program is competently put together. There are a good number of locations and enough detail and events to hold your interest.

I'd rate it above **Timesearch** and **Warlord** for that reason but none of them are a patch on **Terrormolinos** or **Red Moon.**

Terrormolinos
Publisher Melbourne House
Price £6.95 **Memory** 48K
★★★★★

Red Moon
Publisher Level 9
Price £6.95 **Memory** 48K
★★★★★

Warlord
Publisher Interceptor Software
Price £5.50 **Memory** 48K
★★★

Timesearch
Publisher Millenium Software, 17 Whitehouse Drive, Kingstone, nr Hereford.
Price £3.95 **Memory** 48K
★★★

Operation Nightingale
Publisher Softly Softly, 36 Broadlands Road, Bromley, Kent
Price £6.95 **Memory** 48K
★★★

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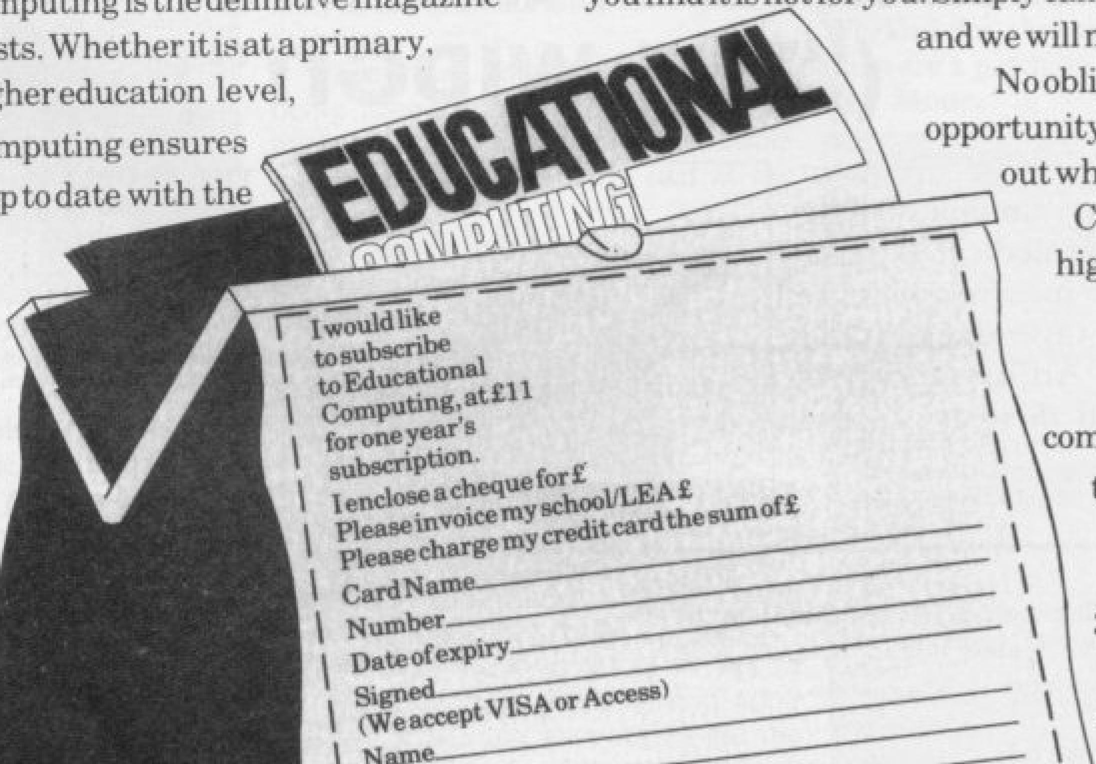
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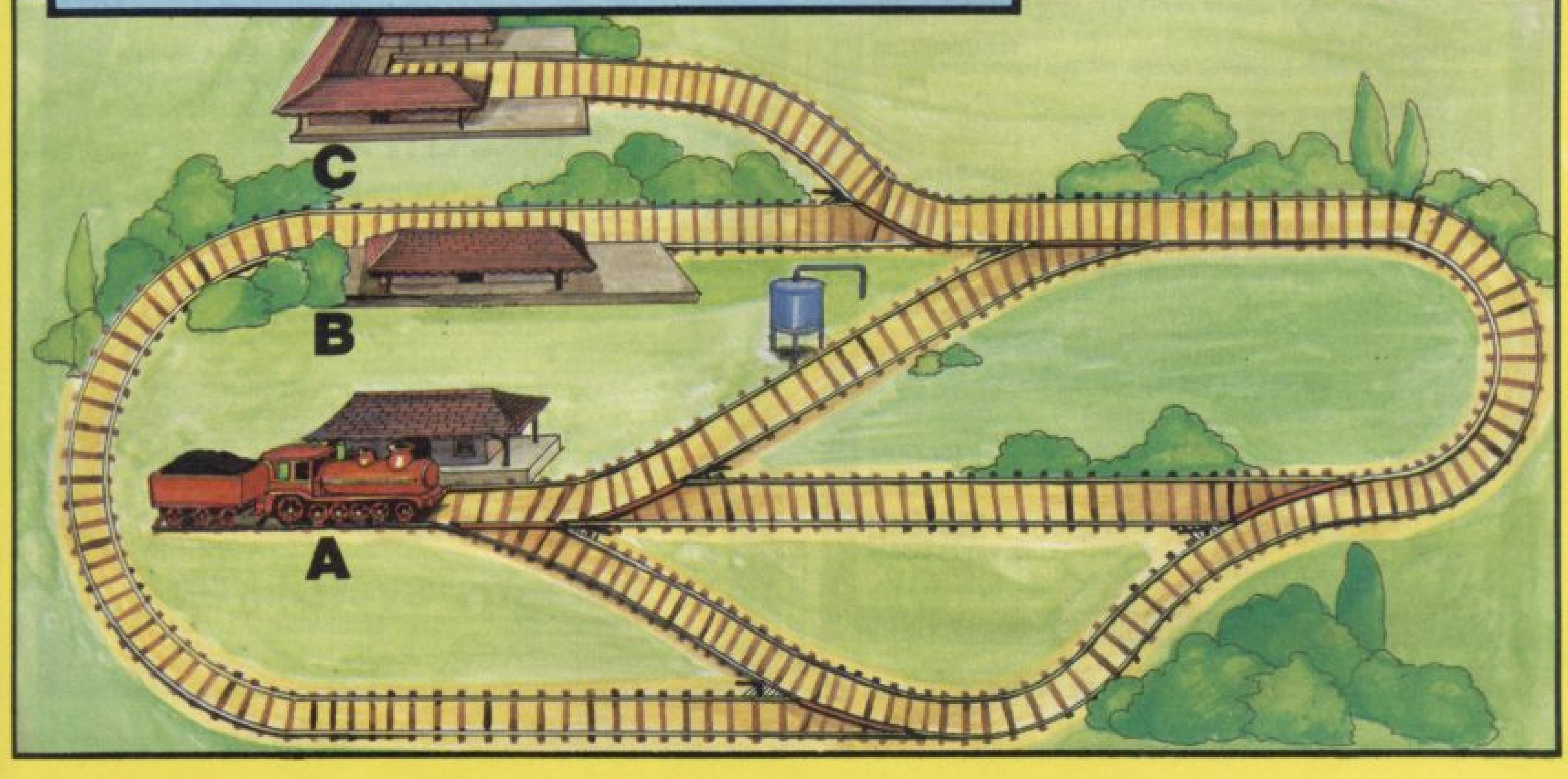
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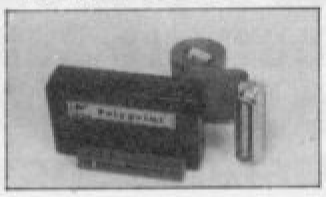
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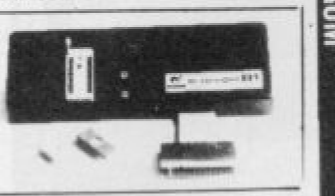
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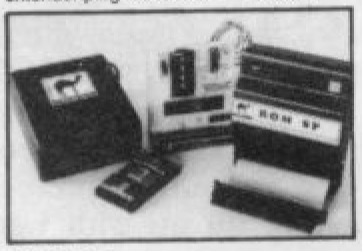
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```
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         EPROM ST ADDR  — 0000
             JOB LENGTH — 4000
                   TASK — CHECK

     WHICH TASK DO YOU WISH TO DO
W) CHECK THAT EPROM IS CLEAN
X) READ THE CONTENTS OF EPROM INTO
   RAM
Y) BLOW AN EPROM WITH DATA FROM
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Z) VERIFY THAT EPROM DATA IS THE SAME
   AS IN RAM
Q TO QUIT                  R TO RESTART
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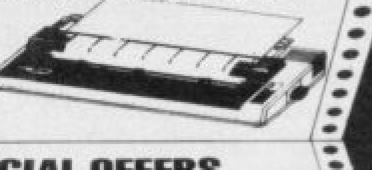
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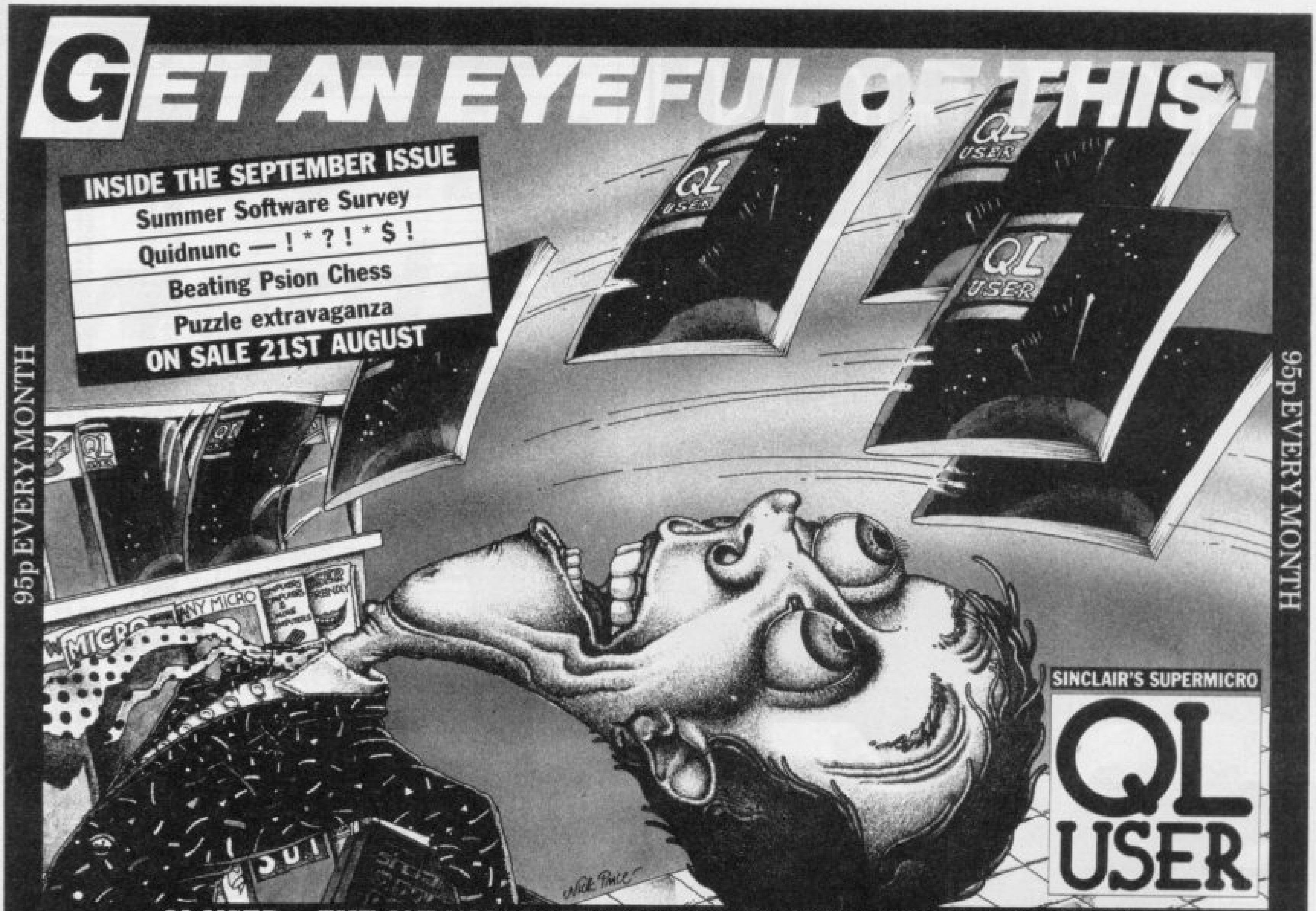
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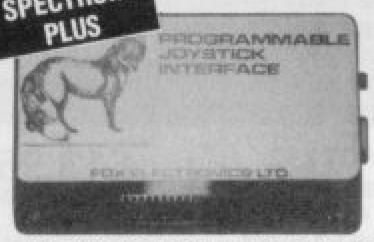
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Routine work in words and music

Andrew Hewson explains how to use Spectrum ROM routines to PRINT to the screen or BEEP on the speaker



THIS MONTH I tackle a couple of perennial machine code topics — the sort that regularly turns up in my postbag. The first question comes from Alan Selby of Carlton-in-Lindrick, Nottinghamshire: **Please could you tell me how to print letters on the screen in machine code?**

Printing from machine code is straightforward as manufacturers have thoughtfully provided a routine in ROM to do all the hard work. The routine is called at address 16 decimal — 10 in hexadecimal — and should be accessed using the special Z80 machine code instruction

RST 16

That instruction is called a restart — hence the RST abbreviation — and is one of eight such special instructions. As far as you are concerned it has the same effect as a CALL instruction except that only one byte instead of three is required to hold it.

The routine is entered with the A register set to the code of the character to be PRINTed, and the appropriate character appears on the screen at the current PRINT position. All registers are preserved by the routine except the AF register pair and in some circumstances it may be necessary to PUSH and POP AF before and after the RST instruction respectively.

The routine listed in table 1 demonstrates the use of RST 16 by PRINTing all characters with codes lying between 32 and 255 inclusive. Note that that includes all tokens so the routine demonstrates that command words like POKE, READ and DRAW can be PRINTed using RST 16 if required. The decimal codes for the routine can be loaded into the printer buffer using the decimal loader listed in table 2.

Decimal	Assembly Code	Comment
62 32	ld a, 32	Load the register with 32
245	Again push af	Save a on the stack
215	rst 16	PRINT the character
241	pop af	Retrieve a from the stack
60	inc a	Increment the a register
32 250	jr nz , Again	Jump to PRINT next character
201	ret	Return when a reaches zero

Table 1. A Spectrum program to PRINT the characters with codes in the range 32 to 255 inclusive. Note that when the a register contains 255, the effect of the inc a instruction is the same as subtracting 255 — a subsequently contains zero.

The RST 16 facility can also be used to control the screen format and layout character codes. Care must be taken not to follow the INK, PAPER and other control codes by invalid numbers, otherwise error code K results. Some of those layout characters are extremely useful, for example

```
LD A , 13
RST 16
```

will PRINT an ENTER character so that the current PRINT position will move to the beginning of the next line.

The PRINT routine at address 16 was not provided by the manufacturers solely for the benefit of users. The Spectrum ROM itself makes extensive use of the facility and is littered with RST 16 instructions. Every time one is used, two bytes of memory are saved — the difference between the length of a CALL and RST instruc-

continued on page 102

continued from page 101

tion. More importantly, the Z80 does not waste time calculating the address which is being called because it is implicit in the instruction. Hence RST commands are very useful for calling routines which are used frequently.

The second topic was suggested by James Beacham of Lincoln: **Lots of Spectrum games have music with them. How do you produce music in machine code?**

The Spectrum BEEP command has two parameters which determine the duration and pitch of the note to be produced. The duration is measured in seconds and the pitch is in semitones relative to middle C. Thus the command

BEEP 0.5 , 1

causes the computer to play C sharp — one semitone above middle C — for half a second.

Three separate ROM routines are used to play a note. The first is the command interpreter which determines that the BEEP command is to be executed as opposed to PRINT or DIM. It also places the two parameters in floating point form on the calculator stack and then passes control to the BEEP command routine itself, located at address 03F8. That routine converts the duration and pitch parameters to two new numbers. The new parameters are passed in the DE and HL register pairs to a third routine, located at 03B5, which drives the loudspeaker causing the correct note to be produced.

```
10 FOR I = 23296 TO 23551
20 INPUT J
30 POKE I , J
40 PRINT I , J
50 NEXT I
```

Table 2. A simple decimal loader for POKEing decimal numbers into the Spectrum printer buffer. To halt the program enter STOP (Symbol Shift A).

The third routine drives the loudspeaker by toggling the low voltage supply to the loudspeaker's electromagnet. That causes the cone of the loudspeaker to vibrate thereby generating an audible sound. The two parameters passed to the routine control the total number of times that the toggling takes place and the rate of repetition.

So how do we relate the rate of repetition and the number of toggles to the frequency and duration of the note required? To answer, we need to know something about the mathematics of music and the language used to describe it.

An octave is a natural separation between two notes. Raising a note by an octave is equivalent to doubling the note's frequency. For example, whilst the frequency of middle C is about 262 cycles per second, the frequency of the note an octave higher — upper C — is about 524 cycles per second. Similarly the frequency of the note an octave higher still is about 1048 cycles per second.

If all the notes ever played were octaves of middle C, music would be very boring and so to add variety each octave is divided into 12 semitones. Those are evenly spaced in the logarithmic scale of frequency — if you take several adjacent semitones and calculate the logarithms of their frequencies, then the difference between the logarithms is the same for each adjacent pair.

'If all the notes ever played were octaves of middle C, music would be very boring'

It would be possible to create all notes from a single reference frequency, stepping up or down the required number of semitones by adding or subtracting the logarithmic increment. Sinclair has chosen not to do that. Instead the frequencies of all 12 semitones in a single reference octave are stored in floating point form in ROM at address 046E. Higher notes are obtained by doubling or quadrupling those frequencies, lower notes by halving or quartering.

The frequencies and the names of the notes are listed in table 3. The logarithm to base ten of each frequency is also listed and it is clear that the difference in each adjacent pair of logarithms is about 0.025.

The BEEP command routine uses this table to calculate the required frequency from the pitch parameter as follows:

The required semitone is determined from the result of the calculation

SEMITONE=INT (PITCH) MOD 12

That gives a value in the range 0.0 to 11.99. The integer part of the number determines which semitone is selected. The frequency is then adjusted upwards using the approximate calculation to take account of any non-integer remainder.

Note	Frequency	Log frequency (to base ten)
Middle C	261.63	2.418
C sharp	277.18	2.443
D	293.66	2.468
D sharp	311.13	2.493
E	329.63	2.518
F	349.23	2.543
F sharp	369.99	2.568
G	392.00	2.593
G sharp	415.30	2.618
A	440.00	2.643
A sharp	466.16	2.669
B	493.88	2.694

Table 3. The semitone table used by the Spectrum.

The required octave is determined from the calculation

OCTAVE=INT (PITCH / 12)

The frequency obtained from the first part of the calculation is then doubled or halved the appropriate number of times. For example, it is doubled once if OCTAVE=1, twice if OCTAVE=2, halved once if OCTAVE= −1.

To complete the conversion of the first parameter the frequency obtained — measured in cycles per second — is multiplied by the duration parameter — in seconds — to give the total number of times the loudspeaker supply line must be toggled. The result is passed to the BEEPER routine at 03B5 in the DE register pair.

The second parameter passed to the BEEPER routine controls the interval of time between each toggling of the loudspeaker line. That interval is not measured in seconds but in the number T states divided by eight, for which the BEEPER routine is to remain in a delay loop before switching the loudspeaker line on or off again. A T state is the period of time that the Z80 microprocessor takes to execute the fastest instruction. In the Spectrum there are 3,500,000 T states per second.

The steps in the calculation are as follows:

Divide 3,500,000 by the frequency of the required note. Divide the result by eight. Subtract 30.125 to take account of overheads at the beginning and end of the delay loop.

The result is passed to the BEEPER routine in the HL register pair.

● *Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewsbury, Oxfordshire.*


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★★★★Value for money
★★★Nothing special
★★Over-priced
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SPECTRUM 16K

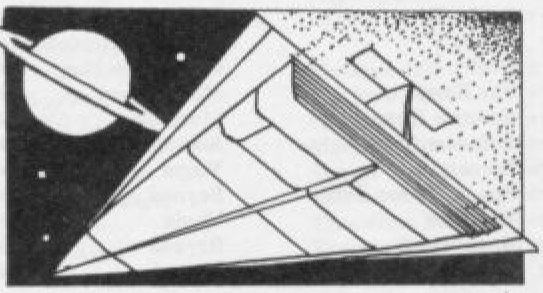
Adventure

Planet of Death	Artic	3★



Arcade

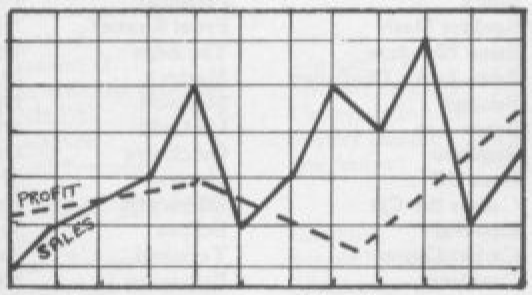
Arcadia	Beau Jolly	3★
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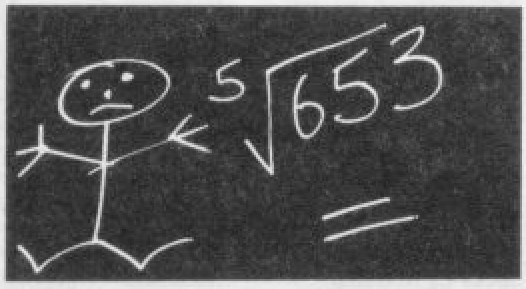
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Survey II	Lobos	3★



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Vu-File	Sinclair	4★

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Money	Poppy	4★
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Regression	University	4★



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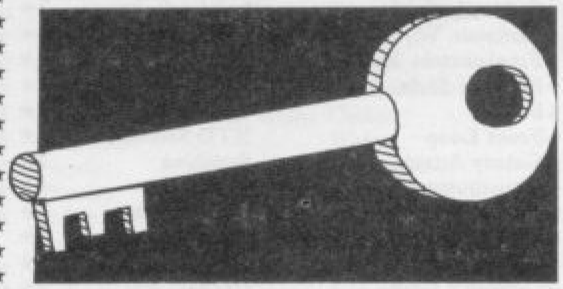
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TT-S	Timedata	4★

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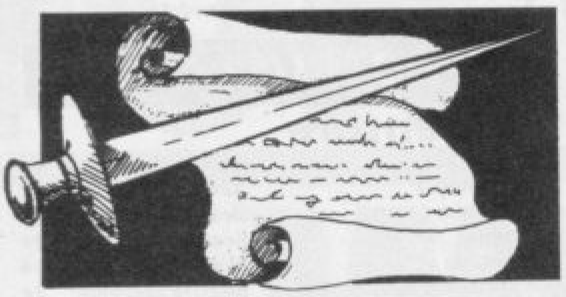
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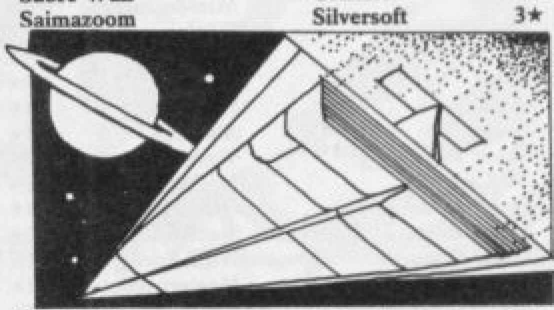
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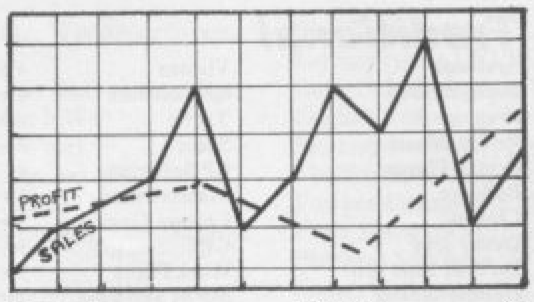


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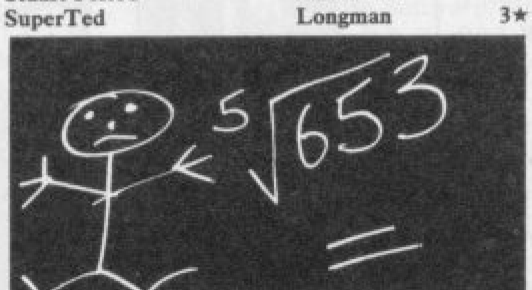
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Mastervision, Park Lorne, 111 Park Road, London NW8 7JL
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Two lovely black eyes . . .

THE GREAT boxing contest enters its second round as the youthful **Elite** claims victory for **Frank Bruno**. It seems a taxi was hired to convey 1,500 extra copies of the game to distributor Micro Dealer who had sold out. The kindergarten was so pleased about being able to afford a taxi that it wrote a press release to inform the world.

Milk prefect **Steve Wilcox** says Bomber Bruno's game is going to be "one of our best-selling games since **Airwolf**." Shouldn't be difficult to beat the sales of the appalling Dunlop commercial **911TS** . . .

Lightweight . . .

Meanwhile **Activision**, purveyor of American Junk Games to gullible Brits, has signed up world lightweight champion **Barry McGuigan** for **World Championship Boxing**. Barry must have been feeling left out as positively the only major sporting figure with no computer game to his name.

Now he's got his big chance, and Activision win this month's **Brazen Backslapper's Award** for its proud claim that the game is a 'totally new concept'.

Spectrum users are unlikely to feel so enthusiastic after being battered into submission by Elite, Alligata, Gremlin Graphics and the other 734 software houses who reckon a black eye and a thick ear is where it's at this summer . . .

Just a load of bull

Gremlin was delighted to receive a large scroll through the post the other day entitled **Cow Boils Head**. The unusual missive tells the story of a cow which forced a woman to boil her head in a bucket.

Veteran Gremlin fans will immediately recognise the delicate touch of **Geoff Davis** and **Micro-Arts**, who have devised a program which churns out endless variations on the tale.

Micronetters may soon be compelled to stomach it, as the high priests of pretension have taken 200 teletext pages to purvey their manic drivel. "We don't want to totally freak people out at first," says the suspiciously mild-voiced Geoff . . ..



Clare 'ligger' Edgeley lets off steam after tanking up at Hewson's Southern Belle launch. As usual, nobody knows why she's giggling.

Chips with everything

'A man who knows his chips' is how his publishers describe **Peter Ellis**, instigator of the **Home Tutor** course in computers. Ellis used to work in the rag trade, but if you pay him the princely sum of £131 you get 12 monthly lessons on tape or disc designed to teach you how to write 'programmes'.

It is intriguing to see that the course is elsewhere said to teach pupils 'how to design their own computer systems'. Move over Sir Clive . . .

Turkeys on the rampage

Deal of the decade has been struck by **Mike Daniels** of **Global Software** with none other than **Mad Medven,** creator of the notorious Golden Turkey Film Awards. Devotees of Channel 4 may recall a series of the most dreadful films of all time. Now the rights to the series have been bought by Daniels, we can expect to see *Attack of the Mushroom People* appearing shortly.

Unfortunately there are no plans yet to computerise *The Creeping Terror*, in which a giant carpet consumes the entire Horlicks-crazed clientele of a small discotheque, but Gremlin reckons there's no sin in hoping . . .

Neverending . . .

Whatever became of **The Neverending Story, David Ward**'s epic game of the film of the translation of the obscure German fairy story?

The Empire's reluctance to release the game is because court advisors reckon they'd better wait for the film to hit the provinces first. Considering how the movie bombed in London, perhaps they'd be better off going for the punters and to hell with the spin-off . . .

Just fancy that

"Products," says old Incorruptible Scolding. "Gremlin should write more about products." Gremlin obliges with a tremendously useless



Nick Faldo contemplates oblivion as his Argus spin-off seems set to follow his British Open hopes down the plughole.

Fact courtesy of **Scotch**, which makes sticky tape and cassettes and stuff. "The UK consumer spends more on videotape than on packet tea, overcoats, wholemeal bread, yogurt, flour, DIY tools, cinema visits or underpants," claims Scotch.

Incredible. A million unsold copies of any grotty game which the UK consumer buys less of than videotape, to anyone who can tell Gremlin why the tape merchants wanted to send *Sinclair User* the information in the first place . . .

The power behind the throne

Finally, it was nice to see young **Fergus McNeill** in the office the other day. Fergus is a bit of a cult, what with the Holy Joystick series of adventures and **Bored of the Rings** winning a *Sinclair User* classic.

Fans of Fergus and **Delta 4** may have heard of Judith, featured on **Skeptical**, a pastiche teletext magazine thrown in free with **Bored of the Rings**. Fergus freely admits that Judith has been one of the driving forces behind his career in software, and let Gremlin have a quick peek at the photo he carries close to his chest.

Gremlin now understands why Fergus spends 95 per cent of his time writing adventure games . . .



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